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HOFFMAN MARITIME CONSULTANTS INC GLEN HEAD NY
USER MANUAL FOR PROGRAM SCOMOT SECOND PART OF
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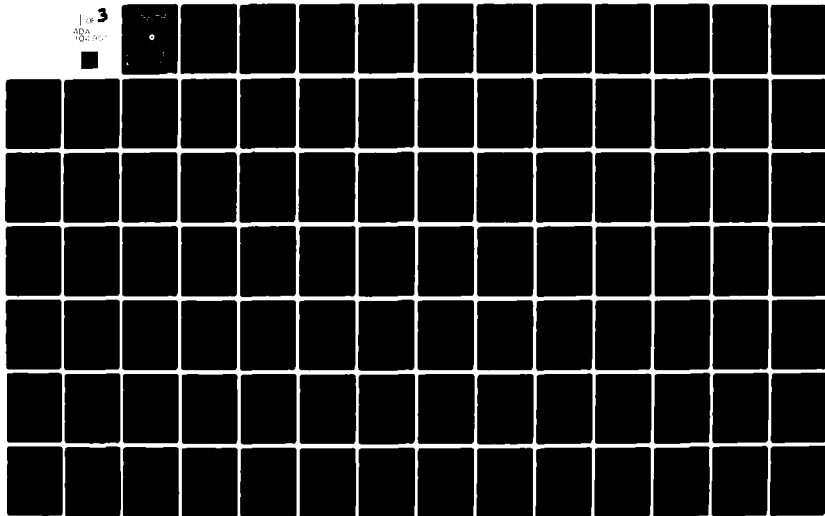
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USER MANUAL FOR PROGRAM SCOMOT —SECOND PART OF COAST GUARD SHIP MOTION PROGRAM

Thomas E. Zielinski

Hoffman Maritime Consultants



FEBRUARY 1981
FINAL REPORT

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PREPARED FOR

U.S. DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD
OFFICE OF MERCHANT MARINE SAFETY
WASHINGTON, D.C. 20593

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1. Report No. G-M-11-80	2. Government Accession No. AD-A304951	3. Recipient's Catalog No.
4. Title and Subtitle User Manual for Program SCOMOT Second Part of U.S.C.G. Ship Motion Program	5. Report Date February 1981	6. Performing Organization Code
7. Author(s) Thomas E. Zielinski	8. Performing Organization Report No. HMC-80161A	9. Work Unit No. (TRAIS) 15
10. Performing Organization Name and Address Hoffman Maritime Consultants Inc. 9 Glen Head Road Glen Head, New York 11545	11. Conduct or Grant No. DOT-CG-958905-A	12. Type of Report and Period Covered Final Manual
13. Sponsoring Agency Name and Address Commandant (G-MMT-4/13) U.S. Coast Guard 2100 2nd St., S.W. Washington, D.C. 20593	14. Sponsoring Agency Code	15. Supplementary Notes Program SCOMOT is proprietary software. It has been made available to the U.S.C.G. and is intended for their internal use. (Ref: Contract CG-74080-B dgc)
16. Abstract A description of program SCOMOT, the second part of the revised and enhanced SCORES program is presented, with the theoretical basis, organization and structure, data input and output formats described. A sample computation using the SL-7 containership is included to aid in the understanding of the input and output formats. This program computes the six-degree of freedom ship motions of heave, pitch, surge, sway, yaw and roll and wave induced sea loads of vertical bending moment and shear force, lateral bending moment and shear force and torsion for a ship advancing at constant speed. The transfer functions for a range of frequency and wave headings are calculated. A variety of spectral definitions ranging from an analytical formulation of the Bretschneider type, to measure spectra, to a hindcast and forecast data can be accepted as a single spectrum or families of spectra divided into wave height groups. Both short term and long term analysis for all responses are performed, and in addition slamming and shipping of water statistics presented.		
17. Key Words Ship motion, RAO's, linear superposition transfer functions, wave induced sea loads spectral families, hindcast, forecast slamming, shipping of water, point motions SL-7	18. Distribution Statement This document is available to the U.S. public through the National Technical Information Service, Springfield, Virginia 22161	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 62 Text 129 Appendix
22. Price		

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This User Manual for Program SCOMOT is for public release. The software part of Project SCOMOT is proprietary and is not included in this document. It will be released in three years per Mr. Paul Cojeen, USCG/Office of Merchant Marine Safety.

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SCOMOT Program - User Manual
Record of Changes

Date	Module/ Subroutine	Page	Description

Abstract

A description of SCOMOT, the second part of the revised SCORES program, developed by Hoffman Maritime Consultant Inc. (HMC) for use by the U.S. Coast Guard, is presented. This program computes the six-degree-of-freedom ship motions and wave induced sea loads for a ship advancing at constant speed in both regular or irregular waves. Program theory, organization and structure, data input and output formats are described. A sample computation using the SL-7 containership is included to aid in the understanding of input and output formats.

I. INTRODUCTION

Program SCOMOT is the second half of the new modified SCORES Program (1)* which predicts ship motions and dynamic loads for a vessel in both a regular and an irregular seaway. The basic input for this procedure, the geometric, weight, and two-dimensional hydrodynamic properties, is prepared by Program STATIC (2). Three levels of vessel responses are calculated:

1. Response Amplitude Operators (RAO)
 - Response to regular sinusoidal waves
2. Short Term Results
 - Response to irregular waves
3. Long Term Results
 - Extrapolation of short term results using a combined Normal and Rayleigh distributions

The motions of displacement, velocity, and acceleration can be calculated for heave, pitch, surge, sway, yaw, and roll as well as for any specific location. The dynamic loads of vertical and lateral shear forces, bending moments and torsional moments are computed. Slamming, shipping of water and propeller racing statistics are available.

Program SCOMOT is a separate program in the modified SCORES procedure, with a stand alone capability. The lengthy calculation of the two-dimensional properties (TDP) in Program STATIC is performed prior to the motion computations.

SCOMOT is written in the FORTRAN IV language, checked out and run on the United Computing Services (UCS) CDC-6600 Computer System.

The method of analysis is outlined below in Section II. The input scheme and data preparation is described in Section III.

*Numbers in parentheses refer to list of references at end of this report.

Typical runs showing input and output formats are shown in Section IV using the Sealand 7 containership. Section V contains error messages and their meaning as well as typical running times for various tasks.

II. OUTLINE OF THEORY

The basic analysis used in SCOMOT can be divided into three topics:

- A. Response Amplitude Operators
- B. Short Term Analysis
- C. Long Term Extrapolation

Each of these areas will be discussed in the following sections.

A. Response Amplitude Operators

Since the original work was performed nearly ten year ago, (3) SCORES has undergone many changes and modifications. The updated theory will be presented in this section.

The ship is considered to be advancing at a constant forward speed with arbitrary heading in regular sinusoidal waves. It is assumed that the six-degree-of-freedom motions are linear and harmonic and that for a given ship speed, heading angle and frequency of encounter, ω_e the motion displacements are

$$\delta_i = a_i \cos(\omega_e t - \epsilon_i)_i \quad i = 1 \dots 6 \quad [1]$$

where a_i is the amplitude of the motion

with $\delta_i = 1 \dots 6$ referring to heave, pitch, surge, sway, yaw and roll respectively. The right handed coordinate system is shown in Figure 1 with the x-axis positive forward, y-axis to starboard, and z-axis positive, downwards with the origin G at the ship's center of gravity.

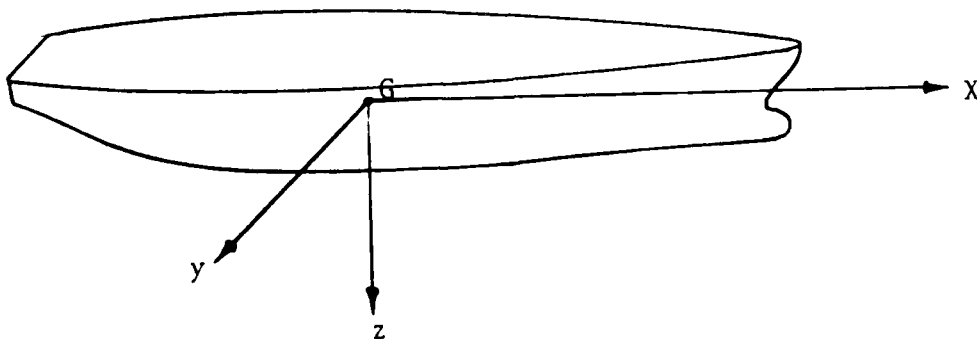


Figure 1.

A ship advancing through regular sinusoidal waves at a constant forward speed V , and heading angle β will have an encounter frequency, ω_e , of

$$\omega_e = \omega - \frac{\omega^2 V}{g} \cos \beta \quad [2]$$

where ω is the wave frequency, g is the acceleration of gravity and β is the heading angling with 0° being following seas and 180° head seas, as shown in Figure 2.

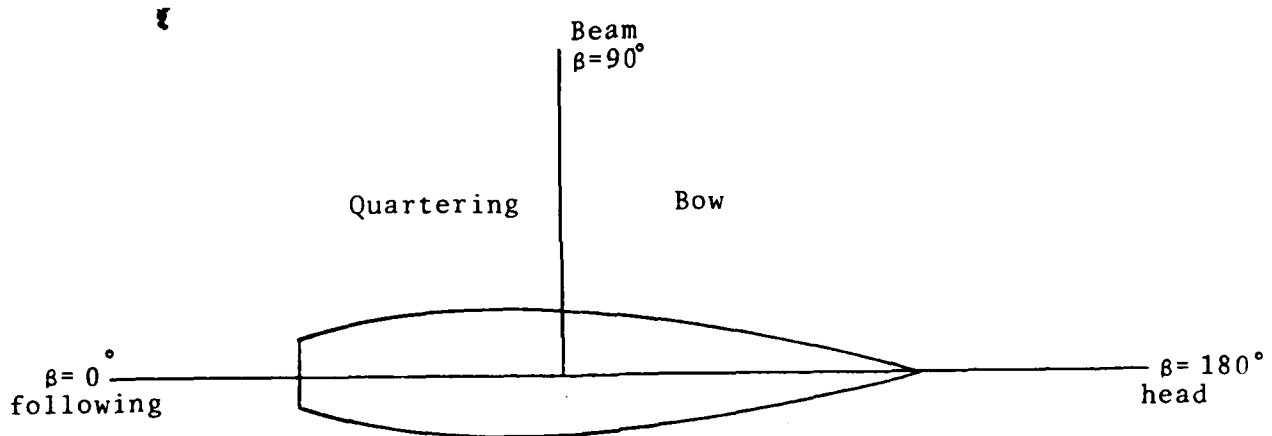


Figure 2.

Under the assumptions that the responses are linear and harmonic the six linear coupled differential equations of motion can be written using subscript notation as follows:

$$\sum_{k=1}^6 [(M_{jk} + A_{jk})\ddot{\delta}_k + B_{jk}\dot{\delta}_k + C_{jk}\delta_k] = F_j e^{i\omega_e t} \quad j=1\dots 6 \quad [3]$$

where M_{jk} generalized mass matrix
 A_{jk} added mass coefficient
 B_{jk} damping coefficient
 C_{jk} hydrostatic restoring coefficient

F_j exciting forces
 $\dot{\delta}_k$ velocity
 $\ddot{\delta}_k$ acceleration

If there is lateral symmetry and the center of gravity is located on the centerline, the six coupled equations of motion [3] reduce to two sets of three coupled equations. The vertical plane equations for heave, pitch and surge can be written as follows:

$$\sum_{k=1}^3 [(M_{jk} + A_{jk})\ddot{\delta}_k + B_{jk}\dot{\delta}_k + C_{jk}\delta_k] = F_j e^{i\omega t} \quad j = 1, 2, 3 \quad [4]$$

and the lateral plane of sway, yaw, and roll as

$$\begin{aligned} \sum_{k=4}^6 [(M_{jk} + A_{jk})\ddot{\delta}_k + B_{jk}\dot{\delta}_k + C_{jk}\delta_k] \\ = F_j e^{i\omega t} \quad j = 4, 5, 6 \end{aligned} \quad [5]$$

1. Vertical Plan Equations

The coupled equations for heave, δ_1 (positive downward), pitch, δ_2 (positive bow up) and surge δ_3 (positive forward) are given below:

$$\begin{aligned} [M + A_{11}]\ddot{\delta}_1 + B_{11}\dot{\delta}_1 + C_{11}\delta_1 + A_{12}\ddot{\delta}_2 + B_{12}\dot{\delta}_2 + C_{12}\delta_2 + \\ A_{13}\ddot{\delta}_3 + B_{23}\dot{\delta}_3 + C_{23}\delta_3 = Z_w \end{aligned}$$

$$\begin{aligned} A_{21}\ddot{\delta}_1 + B_{21}\dot{\delta}_1 + C_{21}\delta_1 + [I_2 + A_{22}]\ddot{\delta}_2 + B_{22}\dot{\delta}_2 + C_{22}\delta_2 + \\ A_{23}\ddot{\delta}_3 + B_{23}\dot{\delta}_3 + C_{23}\delta_3 = M_w \end{aligned}$$

$$\begin{aligned} A_{31}\ddot{\delta}_1 + B_{31}\dot{\delta}_1 + C_{31}\delta_1 + A_{32}\ddot{\delta}_2 + B_{32}\dot{\delta}_2 + C_{32}\delta_2 + \\ [M + A_{33}]\ddot{\delta}_3 + B_{33}\dot{\delta}_3 + C_{33}\delta_3 = X_w \end{aligned}$$

[6]

where Z_w , M_w , and X_w are the exciting forces for heave, pitch, and surge respectively.

Using strip theory the coefficients for these equations are calculated by integrating the two dimensional hydrodynamic properties from Program STATIC. These coefficients are defined as follows:

$$A_{11} = \int A'_{33} dx$$

$$B_{11} = \int N'_z dx - V \int \frac{dA'_{33}}{dx} dx$$

$$C_{11} = \rho g \int B^* dx - V \int \frac{dN'_z}{dx} dx$$

$$A_{12} = - \int x A'_{33} dx$$

$$B_{12} = - \int x N'_z dx + V \int x \frac{dA'_{33}}{dx} dx + 2V \int A'_{33} dx - \frac{V^2}{\omega_c^2} \int \frac{dN'_z}{dx} dx$$

$$C_{12} = - \rho g \int x B^* dx - V^2 \int \frac{dA'_{33}}{dx} dx + 2V \int N'_z dx + V \int x \frac{dN'_z}{dx} dx$$

$$A_{13} = 0.0$$

$$B_{13} = 0.0$$

$$C_{13} = 0.0$$

$$A_{21} = - \int x A'_{33} dx$$

$$B_{21} = - \int x N'_z dx + V \int x \frac{dA'_{33}}{dx} dx$$

$$C_{21} = - \rho g \int x B^* dx + V \int x \frac{dN'_z}{dx} dx$$

$$A_{22} = \int x^2 A'_{33} dx$$

$$B_{22} = \int x^2 N'_z dx - V \int x^2 \frac{dA'_{33}}{dx} dx - 2 V \int x A'_{33} dx - \frac{V^2}{\omega_e^2} \int x \frac{dN'_z}{dx} dx$$

$$C_{22} = \rho g \int x^2 B^* dx + V^2 \int x \frac{dA'_{33}}{dx} dx - 2 V \int x N'_z dx - V \int x^2 \frac{dN'_z}{dx} dx$$

$$A_{23} = (KG-KB) A_{33}$$

$$B_{23} = (KB-KB) B_{33}$$

$$C_{23} = 0.0$$

$$A_{31} = 0.0$$

$$B_{31} = 0.0$$

$$C_{31} = 0.0$$

$$A_{32} = (KG-KB) A_{33}$$

$$B_{32} = (KG-KB) B_{33}$$

$$C_{32} = 0.0$$

$$A_{33} = \int A'_x dx$$

$$B_{33} = \left(\frac{dR_t}{dv} \right)_{V=v_0} + \int N'_x dx$$

$$C_{33} = 0.0$$

$$M = \text{ship's mass}$$

$$I_2 = \text{longitudinal mass moment of inertia} = k_{yy}^2 M$$

where A'_{33} - Sectional heave added mass (from STATIC)

A'_x - Sectional surge added mass

B^* - Local section beam (from STATIC)

N'_x - Sectional surge damping

N'_z - Sectional heave damping (from STATIC)

- V - Ship's velocity
 k_{yy} - pitch or longitudinal gyradius
 ρ - Mass density
 g - acceleration of gravity

All the integrations are over the length of the ship.

The wave excitation, the right hand side of equation [6] is given by

$$\begin{aligned}
 Z_w &= \int \frac{dZ_w}{dx} dx \\
 M_w &= \int x \frac{dZ_w}{dx} dx + \int \frac{dX_w}{dx} (\bar{z} + OG) dx \quad [8] \\
 X_w &= \int \frac{dX_w}{dx} dx
 \end{aligned}$$

The local sectional vertical wave force acting on the ship section is represented as:

$$\frac{dZ_w}{dx} = - \frac{D}{Dt} \left[(A'_{33} + \frac{N'_z}{i\omega_e}) \dot{\eta} e^{-k\bar{h}} - \rho g B^*_{ne} e^{-k\bar{h}} \right] \quad [9]$$

where η is the surface wave elevation, positive upwards, and is defined in complex form as follows:

$$\eta = A i e^{-i(-kx \cos \beta + ky \sin \beta + \omega t)} \quad [10]$$

where k is the wave number and β is the wave heading angle. This expression [9] for local vertical wave force is expanded to the following form:

$$\frac{dZ_w}{dx} = - \left[(\rho g B^* - \frac{\omega}{\omega_e} V \frac{dN'_z}{dx}) \eta + (N'_z \frac{\omega}{\omega_e} - V \frac{dA'_{33}}{dx}) \dot{\eta} + A'_{33} \ddot{\eta} \right] e^{-k\bar{h}} \quad [11]$$

where \bar{h} is the mean section draft. In a similar manner the local longitudinal wave excitation force is as follows:

$$\frac{dX_w}{dx} = -akge^{-k\bar{h}} \cos\beta S(x) \cos(-kx\cos\beta + \omega_e t) \quad [13]$$

where $S(x)$ = local sectional area

The wave induced vertical shear force and bending moment at any location x_0 along the ship's length is as follows:

$$SF_z(x_0) = \left[\int_{x_s}^{x_0} \text{ or } \int_{x_0}^{x_b} \right] \frac{df_z}{dx} dx$$

$$BM_z(x_0) = \left[\int_{x_s}^{x_0} \text{ or } \int_{x_0}^{x_b} \right] \left[(x-x_0) \frac{df_z}{dx} - (z + \overline{OG}) \left(-m\ddot{\delta}_3 + \frac{dX_h}{dx} + \frac{dX_w}{dx} \right) \right] dx \quad [14]$$

where

$$\frac{df_z}{dx} = -m(\ddot{\delta}_1 - x\ddot{\delta}_2) + \frac{dZ_h}{dx} + \frac{dZ_w}{dx} \quad [15]$$

m = local section mass

\bar{z} = local sectional center of buoyancy, from waterline

and

$$\frac{dZ_h}{dx} = V \frac{dA'_{33}}{dx} (\dot{\delta}_1 - x\dot{\delta}_2 + V\dot{\delta}_2) + V \frac{dN'_z}{dx} (\delta_1 - x\delta_2 - V\dot{\delta}_2 / \omega_e^2)$$

$$-A_{33}(\ddot{\delta}_1 - x\ddot{\delta}_2 + 2V\dot{\delta}_2) - N'_z(\dot{\delta}_1 - x\dot{\delta}_2 + 2V\dot{\delta}_2) \quad [16]$$

$$\frac{dX_h}{dx} = A'_x[\ddot{\delta}_3 + (KG-KB)\ddot{\delta}_2] + \left[\left(\frac{1}{L} \left(\frac{dR_t}{dv} \right)_{V=V_0} + N'_x \right) [\dot{\delta}_3 + (KG-KB)\dot{\delta}_2] \right] \quad [17]$$

2. Lateral Plane Equations

The coupled equations of motion for sway, δ_4 , (positive to starboard), yaw, δ_5 , (positive bow-starboard), and roll, δ_6 , (positive starboard down) are given as:

$$M\ddot{\delta}_4 = \int \frac{dYh}{dx} dx + Y_w \quad [18]$$

$$I_z \ddot{\delta}_6 - I_{xz} \ddot{\delta}_5 = \int \frac{dYh}{dx} x dx + N_w \quad [19]$$

$$I_x \ddot{\delta}_6 - I_{xz} \ddot{\delta}_5 = \int \frac{dKh}{dx} dx - Mg \overline{GM} \delta_6 + K_w \quad [20]$$

where

$$\begin{aligned} I_z &= \text{mass moment of inertia of ship about z-axis (yaw)} \\ &= k_z^2 M \end{aligned}$$

$$k_z = \text{yaw radius of gyration}$$

$$\begin{aligned} I_x &= \text{mass moment of inertia of ship about x-axis (roll)} \\ &= k_x^2 M \end{aligned}$$

$$k_x = \text{roll radius of gyration}$$

$$\begin{aligned} I_{xz} &= \text{mass product of inertia of ship in x-z plane} \\ &= k_{xz}^2 M \end{aligned}$$

$$k_{xz} = \text{roll-yaw radius of gyration}$$

$$\frac{dYh}{dz} = \text{local sectional lateral hydrodynamic force}$$

$$\frac{dKh}{dx} = \text{local sectional hydrodynamic rolling moment}$$

$$Y_w, N_w, K_w = \text{wave excitation force and moments}$$

$$\overline{GM} = \text{initial metacentric height}$$

The hydrodynamic sway force is as follows:

$$\begin{aligned} \frac{dYh}{dx} &= \frac{-D}{dt} \left[(M_s + \frac{N_s}{i\omega_e}) (\dot{\delta}_4 + x\dot{\delta}_5 - V\delta_5) \right] + \frac{D}{dt} \left[(F_{rs} + \frac{N_{rs}}{i\omega_e}) \dot{\delta}_6 \right] \\ &+ \overline{OG} \frac{D}{dt} \left[(M_s + \frac{N_s}{i\omega_e}) \dot{\delta}_6 \right] \end{aligned} \quad [21]$$

This is expanded to give:

$$\begin{aligned} \frac{dYh}{dx} = & V \frac{dM_s}{dx} (\dot{\delta}_4 + x\dot{\delta}_5 - V\dot{\delta}_5) + V \frac{dN_s}{dx} (\dot{\delta}_4 + x\dot{\delta}_5 + \frac{V}{\omega_e^2} \dot{\delta}_6) \quad [22] \\ & - M_s (\ddot{\delta}_4 + x\ddot{\delta}_5 - 2V\dot{\delta}_5) - N_s (\delta_4 + x\delta_5 - 2V\delta_5) + \delta_6 (F_{rs} + \overline{OG} M_s) \\ & + \delta_6 [N_{rs} + \overline{OG} N_s - V(\frac{dF_{rs}}{dx} + \overline{OG} \frac{dM_s}{dx})] - \delta_6 V (\frac{dN_{rs}}{dx} + \overline{OG} \frac{dN_s}{dx}) \end{aligned}$$

where \overline{OG} = distance of ship C.G. from waterline, positive up
and the following sectional hydrodynamic properties are from
program STATIC

M_s = sway added mass

N_s = sway damping

F_{rs} = roll sway added mass

N_{rs} = roll sway damping

In a similar manner the hydrodynamic roll moment is as
follows:

$$\begin{aligned} \frac{dKh}{dx} = & \frac{D}{Dt} [(M_{s\phi} + \frac{N_{s\phi}}{i\omega_e}) (\dot{\delta}_4 + x\dot{\delta}_5 - V\dot{\delta}_5)] - \frac{D}{Dt} [(I_r + \frac{N_r}{i\omega_e}) \dot{\delta}_6] \\ & - \overline{OG} \frac{D}{Dt} [(M_{s\phi} + \frac{N_{s\phi}}{i\omega_e}) \delta_6] - \overline{OG} \frac{dYh}{dx} \quad [23] \end{aligned}$$

This can be expressed as:

$$\begin{aligned}
 \frac{dKh}{dx} = & -V \frac{dM_{s\phi}}{dx} (\dot{\delta}_4 + x\dot{\delta}_5 - V\delta_5) - V \frac{dN_{s\phi}}{dx} (\dot{\delta}_4 + x\dot{\delta}_5 + \frac{V}{\omega_e^2} \dot{\delta}_5) \\
 & + M_{s\phi} (\ddot{\delta}_4 + x\ddot{\delta}_5 - 2V\dot{\delta}_5) + N_{s\phi} (\dot{\delta}_4 + x\dot{\delta}_5 - 2V\delta_5) \quad [24] \\
 & - \ddot{\delta}_6 (I_R + \overline{OG} M_{s\phi}) - \dot{\delta}_6 [N_R + N_R^* + \overline{OG} N_{s\phi} - V(\frac{dI_R}{dx} + \overline{OG} \frac{dM_{s\phi}}{dx})] \\
 & + \delta_6 V [\frac{d(N_R + N_R^*)}{dx} + \overline{OG} \frac{dN_{s\phi}}{dx}] - \overline{OG} \frac{dY_h}{dx}
 \end{aligned}$$

where the two dimensional hydrodynamic properties are defined as follows:

- $M_{s\phi}$ = sway-roll added mass moment of inertia
- $N_{s\phi}$ = sway-roll damping
- I_R = roll added mass moment of inertia
- N_R = roll damping

In order to accurately define roll motions near resonance viscous roll damping, N_R^* , must be considered. Two choices for calculating this value are available. The first is the simplest and is as follows:

$$N_R^* = \zeta_\phi C_c / L - N_R(\omega_\phi) dx \quad [25]$$

where

ζ_ϕ = fraction of critical roll damping (empirical data)

C_c = critical roll damping

$$= 2 Mg \overline{GM} / \omega_\phi$$

L = ship length

ω_ϕ = natural roll (resonant) frequency

$$= \left[\frac{Mg \overline{GM}}{I_x + \int I_R(\omega_\phi) dx} \right]^{1/2}$$

$N_r(\omega\phi)$ = roll damping at frequency $\omega\phi$

$I_r(\omega\phi)$ = roll added mass moment of inertia at frequency $\omega\phi$

The viscous roll damping effect can also be calculated for skin friction (4) and eddy making resistances (5) using roll velocity, $\dot{\delta}_6$, as follows:

$$N_r^* = K \dot{\delta}_6 \quad [26]$$

where K depends upon the frequency, the viscosity, the bilge keel dimensions and the hull geometry. This is an interative approach that first assumes a roll velocity, calculates the viscous roll damping and then solves the equations of motion for roll. If the final roll is significantly different from the initial one this process is repeated.

The equations of motion for the lateral plane motions of sway, yaw and roll are as follows:

$$\begin{aligned} [M+A_{44}] \ddot{\delta}_4 + B_{44}\dot{\delta}_4 + C_{44}\delta_4 + A_{45}\ddot{\delta}_5 + B_{45}\dot{\delta}_5 + C_{45}\delta_5 + \\ A_{46}\ddot{\delta}_6 + B_{46}\dot{\delta}_6 + C_{46}\delta_6 = Y_w \\ A_{54}\ddot{\delta}_4 + B_{54}\dot{\delta}_4 + C_{54}\delta_4 + [I_z + A_{55}]\ddot{\delta}_5 + B_{55}\dot{\delta}_5 + C_{55}\delta_5 + \\ [-I_{xz} + A_{56}]\ddot{\delta}_6 + B_{56}\dot{\delta}_6 + C_{56}\delta_6 = N_w \\ A_{64}\ddot{\delta}_4 + B_{64}\dot{\delta}_4 + C_{64}\delta_4 + [-I_{xz}+A_{65}]\ddot{\delta}_5 + B_{65}\dot{\delta}_5 + C_{65}\delta_5 + \\ [I_x+A_{66}]\ddot{\delta}_6 + B_{66}\dot{\delta}_6 + C_{66}\delta_6 = K_w \end{aligned} \quad [27]$$

These coefficients A, B, and C are as follows:

$$A_{44} = \int M_S dx$$

$$B_{44} = \int N_S dx - V \int \frac{dM_S}{dx} dx$$

$$C_{44} = -V \int \frac{dN_S}{dx} dx$$

$$A_{45} = \int x M_S dx$$

$$B_{45} = \int x N_S dx - 2V \int M_S dx - V \int x \frac{dM_S}{dx} dx - \frac{V^2}{\omega_e^2} \int \frac{dN_S}{dx} dx$$

$$C_{45} = V^2 \int \frac{dM_S}{dx} dx - V \int x \frac{dN_S}{dx} dx - 2V \int N_S dx$$

$$A_{46} = - \int F_{RS} dx - \overline{OG} \int M_X dx$$

$$B_{46} = V \int \frac{dF_{RS}}{dx} dx - \int N_{RS} dx + \overline{OG} V \int \frac{dM_S}{dx} dx - \overline{OG} \int N_S dx$$

$$C_{46} = V \int \frac{dN_{RS}}{dx} dx + \overline{OG} V \int \frac{dN_S}{dx} dx$$

$$A_{54} = \int x M_S dx$$

$$B_{54} = \int x N_S dx - V \int x \frac{dM_S}{dx} dx$$

$$C_{54} = -V \int x \frac{dN_S}{dx} dx$$

$$A_{55} = \int x^2 M_S dx$$

$$B_{55} = \int x^2 N_S dx - 2V \int x M_S dx - V \int x^2 \frac{dM_S}{dx} dx - \frac{V^2}{\omega_e^2} \int x \frac{dN_S}{dx} dx$$

$$C_{55} = V^2 \int x \frac{dM_S}{dx} dx - V \int x^2 \frac{dN_S}{dx} dx - 2V \int x N_S dx$$

$$A_{56} = - \int x F_{RS} dx - \overline{OG} \int x M_S dx$$

$$B_{56} = V \int x \frac{dF_{RS}}{dx} dx - \int x N_{RS} dx + \overline{OG} V \int x \frac{dM_S}{dx} dx - \overline{OG} \int x N_S dx$$

$$C_{56} = V \int x \frac{dN_{rs}}{dx} dx + \overline{OG} V \int x \frac{dN_s}{dx} dx$$

$$A_{64} = - \int M_{s\phi} dx - \overline{OG} A_{44}$$

$$B_{64} = - \int N_{s\phi} dx + V \int \frac{dM_{s\phi}}{dx} - \overline{OG} B_{44}$$

$$C_{64} = V \int \frac{dN_{s\phi}}{dx} dx - \overline{OG} C_{44}$$

$$A_{65} = - \int x M_{s\phi} dx - \overline{OG} A_{45}$$

$$B_{65} = - \int x N_{s\phi} dx + 2V \int M_{s\phi} dx + V \int x \frac{dM_{s\phi}}{dx} dx + \frac{V^2}{\omega_e^2} \int \frac{dN_{s\phi}}{dx} dx - \overline{OG} B_{45}$$

$$C_{65} = -V^2 \int \frac{dM_{s\phi}}{dx} dx + V \int x \frac{dN_{s\phi}}{dx} dx + 2V \int N_{s\phi} dx - \overline{OG} C_{45}$$

$$A_{66} = \int I_R dx + \overline{OG} \int M_{s\phi} dx - \overline{OG} A_{46}$$

$$B_{66} = -V \int \frac{dI_R}{dx} dx + \int (N_R + N_R^*) dx - \overline{OG} V \int \frac{dM_{s\phi}}{dx} dx + \overline{OG} \int N_{s\phi} dx - \overline{OG} B_{46}$$

$$C_{66} = Mg \overline{GM} - V \int \frac{d(N_R + N_R^*)}{dx} dx - \overline{OG} V \int \frac{dN_{s\phi}}{dx} dx - \overline{OG} C_{46}$$

with all the integrations over the ship length.

The wave excitation, the right-hand sides of Equation [27] is given by

$$Y_w = \int \frac{dY_w}{dx} dx \quad [28]$$

$$N_w = \int x \frac{dY_w}{dx} dx \quad [29]$$

$$K_w = \int \frac{dK_w}{dx} dx \quad [30]$$

The local sway sectional excitation force becomes:

$$\begin{aligned} \frac{dY_w}{dx} = & \left[(\rho S + M_s) \frac{Dv_w}{Dt} - V v_w \frac{dM_s}{dx} + k(-F_{rs} \frac{Dv_w}{Dt} + V \frac{dF_{rs}}{dx} v_w) \right. \\ & \left. + \frac{\omega}{\omega_e} N_s v_w + \frac{V}{\omega \omega_e} \frac{dN_s}{dx} \frac{Dv_w}{Dt} \right] \frac{\sin(\frac{\pi B^*}{\lambda} \sin \beta)}{\frac{\pi B^*}{\lambda} \sin \beta} \end{aligned} \quad [31]$$

and the local roll sectional excitation moment

$$\begin{aligned} \frac{dK_w}{dx} = & \left[-\frac{D}{Dt}(F_{rs} v_w) + \rho \left(\frac{B^{*3}}{12} - S \bar{z} \right) \frac{Dv_w}{Dt} - \frac{\omega}{\omega_e} N_{rs} v_w - \right. \\ & \left. \frac{V}{\omega \omega_e} \frac{dN_{rs}}{dx} \frac{Dv_w}{Dt} \right] \frac{\sin(\frac{\pi B^*}{\lambda} \sin \beta)}{\frac{\pi B^*}{\lambda} \sin \beta} - \overline{OG} \frac{dY_w}{dx} \end{aligned} \quad [32]$$

where v_w = lateral orbital wave velocity

S = local section area

\bar{z} = local sectional center of buoyancy from waterline

The lateral orbital wave velocity in complex form is as follows:

$$V_w = -A k e^{-k\bar{h}} \sin i e^{-i(kx \cos \beta + ky \sin \beta + \omega_e t)} \quad [33]$$

and

$$\frac{Dv_w}{Dt} = - Akge^{-kh} \sin\beta e^{-i(-kxcos\beta + ky \sin\beta + \omega_e t)} \quad [34]$$

where c = wave celerity (speed)

k = wave number

λ = wave length

The wave induced lateral shear force, the lateral bending moment, and the torsional moment are defined as follows:

$$SF_y(x_0) = \left[\int_{x_s}^{x_0} \text{or} \int_{x_0}^{x_b} \right] \frac{df_y}{dx} dx \quad [35]$$

$$BM_y(x_0) = \left[\int_{x_s}^{x_0} \text{or} \int_{x_0}^{x_b} \right] (x-x_0) \frac{df_y}{dx} dx \quad [36]$$

$$TM_x(x_0) = \left[\int_{x_s}^{x_0} \text{or} \int_{x_0}^{x_b} \right] \frac{dtx}{dx} dx \quad [37]$$

where

$$\frac{df_y}{dx} = -m(\ddot{\delta}_4 + x\ddot{\delta}_5 - \zeta\ddot{\delta}_6) + \frac{dY_h}{dx} + \frac{dY_w}{dx} \quad [38]$$

$$\begin{aligned} \frac{dtx}{dx} = & -m\gamma^2\ddot{\delta}_6 + m\zeta(\ddot{\delta}_4 + x\ddot{\delta}_5) - \rho g \left[\frac{B^*{}^3}{12} - S(\bar{z} + \overline{OG}) \right] \delta_6 \\ & - g m \zeta \delta_6 + \frac{dK_h}{dx} + \frac{dK_w}{dx} \end{aligned} \quad [39]$$

where ζ = local section's center of gravity (relative to to ship C. G.) positive down

γ = local section's mass gyradius in roll

Point motions for vertical, lateral and longitudinal directions can be calculated using the six primary motions. The displacements at a point, x_0 , y_0 , z_0 measured from the ship's center of gravity, are as follows:

$$\begin{aligned}\delta_7 &= \delta_1 - x_0\delta_2 + y_0\delta_6 \\ \delta_8 &= \delta_4 + x_0\delta_5 - z_0\delta_6 \\ \delta_9 &= \delta_3 + z_0\delta_2 + y_0\delta_5\end{aligned}\tag{40}$$

where δ_7 , δ_8 , and δ_9 are the vertical lateral and longitudinal displacements respectively. Velocity and acceleration are obtained by successive differentiations of Equation [40].

Relative point motions are computed by using the point motion Eq. [40], minus the wave motion as given in Equation [10].

Once the motions responses have been calculated for a range of frequencies and wave headings, the short term analysis can be performed.

B. Short Term Analysis

The basic input for the short term analysis is the response amplitude operators and the wave spectra. This section will be divided into two parts, first the discussions of the wave spectra and then the numerical procedure to evaluate the short term responses.

The wave spectrum can either be a long crested sea spectrum, that is uni-directional as in the case of swell, or a short crested sea spectrum where the energy is coming from many directions

The short-crested sea spectrum is obtained by combining a point spectrum with a spreading function. The point spectrum can either be analytical, such as the ISSC, ITTC or JONSWAP formulations, all being forms of the Bretschneider spectra, or a measured spectrum, such as those from Stations I, K and P or any other source.

If the two-dimensional sea spectrum, $S_{\zeta}(\omega, x_j)$, is assumed to be the product of the one-dimensional sea spectrum, $S_{\zeta}(\omega)$, and a spreading function $f(x_j)$, then

$$S_{\zeta}(\omega, x_j) = S_{\zeta}(\omega) \cdot f(x_j) \quad [41]$$

where x_j is the wave direction angle. A commonly used form of this is the cosine-squared spreading function:

$$\begin{aligned} f(x_j) &= \frac{2}{\pi} \cos^2(x_j) & \text{for } |x_j| \leq \frac{\pi}{2} \\ &= 0.0 & \text{for } |x_j| > \frac{\pi}{2} \end{aligned} \quad [42]$$

Figure 3 shows the resulting directional wave energy topography for a typical directional spectrum based on the above spreading function.

A more general formulation of the spreading function has been adopted here so that spreadings other than $\pm \pi/2$ and other powers of the cosine function can be used. An extremely confused sea with waves from different storm areas might have spreading larger than $\pm \pi/2$; conversely waves in a restricted waterway

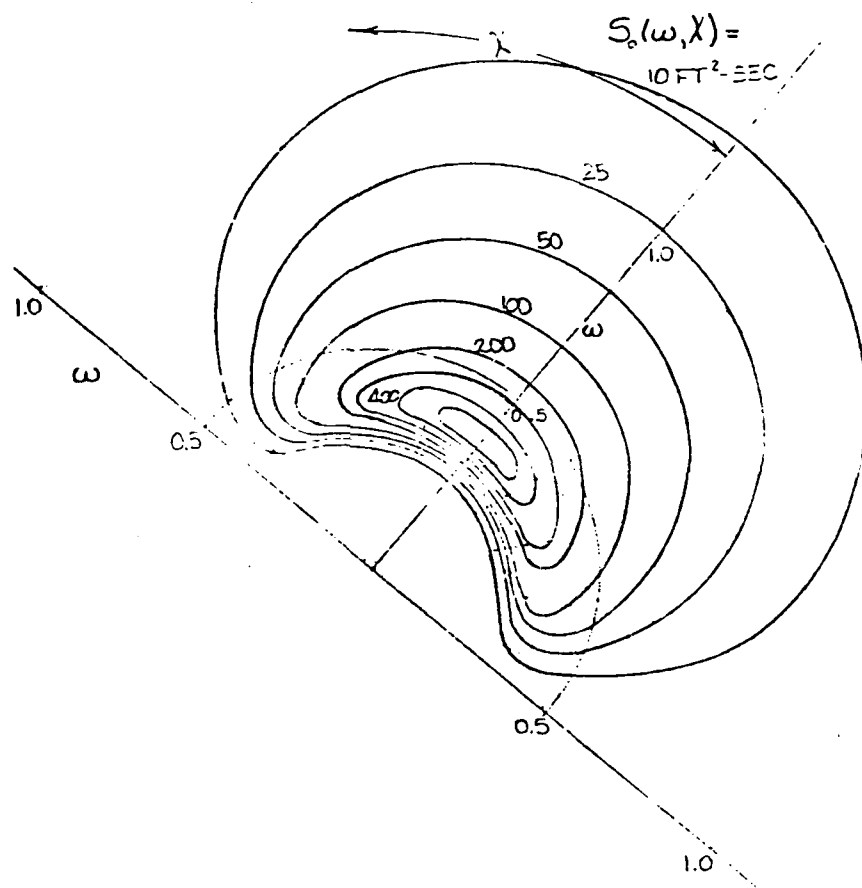


Figure 3.

might be less than $\pm \pi/2$, with the limiting case being 0 for long-crested waves.

The general spreading formula is:

$$\begin{aligned} F(x_j) &= \frac{1}{A} \cos^{2v} \frac{x_j}{x_{jo}} & \text{for } |x_j| \leq x_{jo} \\ &= 0.0 & \text{for } |x_j| > x_{jo} \end{aligned} \quad [43]$$

with $A = \int_{-x_{jo}}^{+x_{jo}} \cos^{2v} \frac{x}{x_{jo}} dx$

where x_{jo} is the angular spread and $2v$ is the power of the cosine function.

The energy spectrum is customarily given in length²-second units at frequencies specified in radians per second. The spectra are usually divided into several groups, based on wave height intervals, with each group containing from one to 15 spectra. Typical analytical formulations for the point spectrum are now given.

Neumann Spectrum (1953)

This frequency spectrum (as used) is given by:

$$S(\omega) = 0.000827 g^2 \pi^3 \omega^{-6} g^2 \omega^{-2} U^{-2} \quad [44]$$

where U = wind speed

Pierson-Moskowitz (1964) (ITTC Spectrum)

This is given by:

$$S(\omega) = \frac{.0081 g^2}{\omega^5} \exp \left(-\frac{.0324 g^2}{H_1^2 \omega^4} \right) \quad [45]$$

or

$$S(\omega) = 0.0081 g^2 \omega^{-5} e^{-.74 g^4 \omega^{-4} U^{-4}}$$

and was derived on the basis of fully arisen seas.

Two Parameter (1967) (ISSC Spectrum)

$$S(\omega) = \underline{A} \cdot \underline{B}^{-5} e^{-\underline{B}\omega^{-4}} \quad [46]$$

where

$$A = 0.25 H_{1/3}^2$$

$$B = (0.817 \frac{2\pi}{T_1})^4$$

$H_{1/3}$ = significant wave height ($=2.0a_{1/3}$)

T_1 = mean wave period

JONSWAP

$$S_2(\omega) = S(\omega)_{ISSC} \cdot \frac{1}{F_1} \gamma \exp \left[-\frac{1}{2\sigma^2} (.2043\omega \cdot T_1 - 1)^2 \right] \quad [47]$$

where F_1 = ratio of area of JONSWAP spectra to area of ISSC spectrum. This corrects JONSWAP to required wave height.

σ = Spectra widths to each side of the spectral peak

$$= 0.07 \quad \omega \leq 4.848/T_1,$$

$$0.09 \quad \omega > 4.848/T_1,$$

γ = is the ratio of the maximum spectral energy to the maximum of the corresponding Pierson-Moskowitz spectrum. The examination of the Great Lakes wave data has shown the mean gamma to be 2.3.

Ideally, measured spectra representing a wide range of heights and periods should be used to represent an irregular seaway in conjunction with an assumed spreading function. Files of wave data representing typical ocean areas such as Station "India" in the northeast Atlantic or Station "Papa" in the northwest Pacific at

the entrance to the Gulf of Alaska are currently available. Another source of wave data in a spectral ordinate form is hindcast and forecast weather from a spectral ocean wave model (SOWM).

Once the wave spectra is defined using the principles of linear superposition the short term responses can be calculated.

The rms response for a particular ship heading, χ_i , relative to the dominant wave direction, for a particular wave spectrum, indicated by n , is:

$$\text{RESP} (\chi_i, n) = \left[\int_{\omega} \int_{\chi} \text{RAO}^2 (\omega, \chi) S_{\zeta n} (\omega) f(\chi_j) d\chi d\omega \right]^{\frac{1}{2}} \quad [48]$$

where χ

is the relative ship wave angle, defined as, $\chi_j - \chi_i$, $\text{RAO} (\omega, \chi)$ is the response amplitude operator as a function of angle χ , and frequency ω ; $S_{\zeta, n}(\omega)$ is the spectral energy for a particular point spectrum, n , as a function of frequency ω ; and $f(\chi_j)$ is the spreading function versus component angle χ_j .

In any wave group the response calculation can be carried out for many spectra, N , and for headings ranging from 0 to 180°. At each heading the mean rms response, $\mu(\chi_i)$ and standard deviation $\sigma(\chi_i)$ can be calculated as follows:

$$\mu(\chi_i) = \frac{1}{N} \sum_{n=1}^N \text{RESP} (\chi_i, n) \quad [49]$$

$$\sigma^2(\chi_i) = \frac{1}{N} \sum_{n=1}^N \left[(\text{RESP} (\chi_i, n) - \mu(\chi_i))^2 \right] = \left[\frac{1}{N} \sum_{n=1}^N [\text{RESP} (\chi_i, n)]^2 - \mu^2(\chi_i) \right] \quad [50]$$

The average response of the ship to all headings for a given wave group is then,

$$\mu = \sum_{i=0}^{360} P(\chi_i) \mu(\chi_i)$$

where $p(x_i)$ is the probability of occurrence of each heading angle. The standard deviation (squared) is then, as given in (7),

$$\sigma^2 = \sum_{i=0}^{360} P(x) [\mu^2(x_i) + \sigma^2(x_i)] - \mu^2 \quad [51]$$

The calculation of the means and standard deviations of a response for each wave heading and each wave height group provide the basis for obtaining a cumulative long-term distribution of the response.

C. Long Term Statistics

The long-term distribution for each wave (weather) group can be determined assuming that the actual peak to trough values of the responses over the short term are Rayleigh distributed and the short term r.m.s. values for any wave height are normally distributed. Using the mean and standard deviation for each wave height group, a cumulative long term distribution of response by the summation of many Rayleigh distributions can be obtained (8). Using the probability of occurrence of the wave height groups, these long-term curves can then be combined to give a single long term curve covering all sea conditions. This long term theory has been extensively covered in (8) with hand verification in (9) and computer program and documentation in (10).

III. DESCRIPTION OF INPUT SCHEME

There are three separate data files used in running SCOMOT:

- (1) Two dimensional hydrostatic and hydrodynamic properties (TDP) file.
- (2) Job control data file.
- (3) Spectral family file.

The TDP file is prepared by Program STATIC and contains the two-dimensional hydrodynamic added mass and damping for vertical and lateral motions. The wetted offsets as well as the geometry to the main deck is also included for each station. The spectral data file is used for calculating the short-term and long-term responses. This file consists of spectral energy ordinates for a series of frequencies and can be a measured, hindcast forecast, or mathematical spectrum. The job control file directs the execution of the program and can be prepared by Program STATIC.

In order to have a uniform naming procedure for datafiles, the use of 2 two letter prefixes are employed for each datafile type. A limit of seven letters for a filename exists on the present computer system, therefore 5 letters, indicated by "X", can be used to describe the ship and its loading condition. Summarizing the datafiles for program STATIC and SCOMOT the following conventions have been adopted:

- | | |
|---------------------------|---|
| (1) OFXXXXX or
MMTXXXX | Ship offset file |
| (2) D2XXXXX | Job control file for STATIC |
| (3) DWXXXXX | Weight description for STATIC |
| (4) TDXXXXX | Two dimensional hydrodynamic
properties file created by STATIC
and used in SCOMOT |
| (5) DMXXXXX | Job control file for ship motion
program SCOMOT |
| (6) SPXXXXX | Spectral datafile of hindcast, fore-
cast, measured, etc. point energy
spectra. |

A. Two Dimensional Properties

This file contains the two dimensional properties (TDP) for each ship section and is prepared by program STATIC. The output from program STATIC for this example is shown in Appendix D. The full offsets to the main deck with the origin at the intersection of the keel and centerline are stored in the TDP file along with the wetted geometry for each station, using the waterplane and centerline as the reference axis. The two-dimensional hydrodynamic added mass and damping coefficients for 25 frequencies are also stored for each section. These hydrodynamic properties are as follows:

<u>SYMBOL</u>	<u>DESCRIPTION</u>	<u>DIMENSION</u>
Frequency Parameter	$\frac{\omega^2 D}{g}$	Non-Dimensional
A' ₃₃	Heave added mass	F-sec ² /L ²
N' _z	Heave damping	F-sec/L ²
M _s	Sway added mass	F-sec ² /L ²
N _s	Sway damping	F-sec/L ²
F _{rs}	Added mass for sway-roll cross coupling	F-sec
N _{rs}	Damping for sway-roll cross coupling	F-sec/L

<u>SYMBOL</u>	<u>DESCRIPTION</u>	<u>DIMENSION</u>
I_r	Added moment of inertia in roll	$F\text{-sec}^2$
N_r	Roll damping	$F\text{-sec}$
$M_{s\phi}$	Roll-sway added mass moment of inertia (same as Frs - not printed)	$F\text{-sec}^2/L$
$N_{s\phi}$	Roll-sway damping (same as Nrs - not printed)	$F\text{-sec}/L$

where

F is force units

L is length units

D is station draft

ω is frequency (radians/second)

g is acceleration of gravity

This file is in binary form and cannot be listed, therefore, a small program and explanation are given in Appendix D so that this file can be interpreted.

B. Job Control Data File (DMXXXXXX)

This data file controls the execution of program SCOMOT using control tags and other information separated into data sets given below. This file is created by Program STATIC and can be edited for specific conditions desired for each run.

Data Set 1	File Names
2	Ship Name or Title
3	Program Option Control
4	Units Specification (i.e., Metric or English)
5	Length and Displacement
6	Two-dimensional Geometric Properties
7	Vertical Center of Gravity & Roll Gyradius
8	Summary Weight Properties
9	Sectional Weight Properties
10	Moment Station and Resistance Variation for Surge
Data Set 11	Slamming, Shipping of Water and Propeller Racing
12	Input Point Coordinates
13	Run Control
14	Ship Speeds
15	Wave Frequencies
16	Wave Angle
17	Roll Damping
18	Analytical Spectra
19	Heading Probability
20	Wave Group Distribution
21	Spreading Function
22	Long Term Limits
23	Response Control

In the following section, the data input format is divided into three types:

- | | | |
|---|--------------|--|
| A | Alphanumeric | - Combination of letter and numbers. This is used as a title or descriptive header |
| I | Integer | - A whole number which must be right justified in input field |
| F | Real | - A real number that contains a decimal point |

DATA SET 1

FILE NAME CARD

The name of the two-dimensional hydrodynamic coefficient data file (TDPname) and the transfer function file (RAOname) are included in this data set.

<u>Letter Code</u>	<u>Columns</u>	<u>Format</u>	<u>Entry</u>
TDPname	1-7	A	TDP input file name
RAOname	11-17	A	Input or output file name of transfer functions
SPEname	21-27	A	Spectral family input data file name. This is needed if spectral family wave option is selected.

DATA SET 2

SHIP NAME CARD

Title of Ship Name

Format (36A1)

This is the title that normally identifies the owner, the ship name, and/or the loading condition.

DATA SET 3

OPTION CONTROL CARD

<u>Letter Code</u>	<u>Columns</u>	<u>Format</u>	<u>Entry</u>
A	1-2	I	TDP file option control tag
B	3-4	I	Unit option control tag
C	5-6	I	Speed option control tag
D	7-8	I	Wave spectra option control tag
E	9-10	I	Wave frequency option control tag
F	11-12	I	RAO selection option control tag
G	13-14	I	Degrees of freedom option control tag
H	15-16	I	Number of motion input points
I	17-18	I	Slamming, shipping of water, and propeller emersion option control tag

<u>Letter Code</u>	<u>Columns</u>	<u>Format</u>	<u>Entry</u>
J	19-20	I	Roll damping option
K	21-22	I	Terminal type
L	23-24	I	Directionality option control tag
M	25-26	I	Mass input option con- trol tag
N	27-28	I	Heading probability option control tag
O	29-30	I	Wave distribution option control tag
P	31-32	I	Speed input option con- trol tag
Q	33-34	I	Frequency input option control tag
R	35-36	I	Wave angle input option control tag

Definition of Option Control Tags

A. TDP file option control tag

(two dimensional properties such as added mass and damping)

Options Available

0---read TDP file from file TDPname and no printout

1---read TDP file from file TDPname and printout data

B. Unit Option--sets, units and constants for program (GRAV is acceleration of gravity GAMMA is the density of water and VNY is the kinematic viscosity of salt water at 59°F)

0---British Units (feet, L. Tons)

GRAV = 32.174, GAMMA = .02857143, VNY = 1.2791×10^{-5}

1---Metric Units (Meters, M. Tons)

GRAV = 9.807, GAMMA = 1.025, VNY = 1.1883×10^{-6}

2---British Units (Feet, Pounds)

GRAV = 32.174, GAMMA = 64.0, VNY = 1.2791×10^{-5}

3---Metric Units (Meters, K. Gram)

GRAV = 9.807, GAMMA = 1025.0, VNY = 1.1883×10^{-6}

4---Input desired constants and units in program
on Data set 4

Note: VNY $\cong 1.23 \times 10^{-5}$
used when J = 1

C. Ship Speed Option

0---Ship speed is input in knots

1---Ship speed is input in velocity units consistent with the ship's length units. (i.e., feet/sec or meters/sec) on Data Set 14 in conjunction with option control tag P.

D. Wave Spectra Option

0---Regular wave - transfer functions only

1 or 6---Generate Neumann spectra from inputted wind speed. Print spectral properties if D=6; no print if D=1

2 or 7---Generate Pierson-Moskowitz spectra from inputted wind speed. Print spectral properties if D=7; no print if D=2

3 or 8---Generate ISSC two parameter spectra from inputted significant wave height ($H_{1/3}$) and mean period (T_1). Print spectral properties if D=8; no print if D=3

4 or 9---Generate JONSWAP spectra from inputted significant wave height ($H_{1/3}$) mean period (T_1) and Gamma parameter. Print spectral properties if D=9; no print if D=4

- 5 or 10---Spectral family using inputted spectral ordinates as described in Section III,C. Print spectral properties if D=10: no print if D= 5.
- E. Wave Frequency (must be coordinated with option tag Q)
- 0---Radian/second used for frequencies in calculation of transfer functions
 - 1---Cycles/second (Hz) used for frequencies in calculation of transfer functions
 - 2---Wave lengths (Ft. or M) used for calculation of transfer functions
- F. RAO Selection Option - change F to a 1 after initial execution.
- 0---Calculate transfer functions and store in file RAOname
 - 1---Read transfer functions calculated previously and stored in file RAOname
- G. Degrees of Freedom Option -
- 0---Vertical and lateral plane including surge
 - 1---Vertical plane only including surge effect
 - 2---Lateral plane only
 - 3---Vertical and lateral plane (no surge)
 - 4---Vertical plane only (no surge)
- H. Number of Acceleration (Relative Motion) Points
- If greater than zero, program will read these points in data set 12. (Maximum of 30 points)
- I. Slamming, Shipping of Water and Propeller Emersion Option
- 0---Slamming, shipping of water and propeller emersion calculations are not performed
 - 1---Slamming and shipping of water calculations are performed at forward perpendicular. Depth at forward perpendicular is read from data set 11. Propeller emersion at AP is performed with propeller height and diameter read from data set 11.
- J. Roll Damping Option
- 0---Use shortened roll damping routine and input roll damping factor on data set 17.
 - 1---Use detailed roll damping routine accounting for viscous and bilge keel effects. Read data set 17.

K. Terminal Type

- 0---Terminal with form feed and 132 character width
- 1---Terminal with form feed and 80 character width
- 2---Terminal without form feed and 132 character width
- 3---Terminal without form feed and 80 character width

L. Directionality Option Control Tag

- 0---Cosine squared at ± 90 degrees - spreading is used
- 1---Uni-directional waves (i.e., long crested)
- 2---Read power of cosine function and wave spreading from data set 21.

M. Mass Input Option

- 0---Input weight distribution
- 1---Input summary weight properties pitch radius of gyration and longitudinal center of gravity in data set 8

N. Heading Probability Option Control Tag

- 0---Equal probability of heading used in short and long term analysis
- 1---Read probability of heading in data set 19

O. Wave Height Distribution Option Control Tag

Need only for long term calculations

- 0---If not running long term calculations or if option tag D=5' or 10 and probabilities are read from file SPEname
- 1---Read new wave height distributions from data set 20

P. Speed Input Option Control Tag

- 0---Input initial, final and increment of speed in data set 14
- 1---Input number of speeds and ship speeds in data set 14

Q. Frequency-Input Option Control Tag

- 0---Program assumes frequency range from .02 to 1.85 in steps of .05 radians/sec
- 1---Input initial frequency (wave length), final frequency (wave length) and increment of frequency (wave length) in data set 15
- 2---Input number of frequencies (wave length) and frequencies (wave lengths) in data set 15

R. Wave Heading Input Option Control Tag

- 0---Program assumes wave heading of 0 degrees to 180 degrees in 15 degree increments \leq usual
- 1---Input initial, final and increment of wave heading in data set 16
- 2---Input number of wave headings and wave headings in data set 16

DATA SET 4

UNIT CARD

This card is read only if unit option control tag (B) is 4.

Column =	Format	Entry
5-10	A	Length Unit (i.e.METERS)
11-20	A	Weight Unit (i.e.POUNDS)
21-30	F	Acceleration of gravity $[L/T^2]$
31-40	F	Density of water $[F/L^3]$
41-50	F	Kinematic Viscosity $[L^2/T]$ of water

DATA SET 5

LENGTH CARD

1-10	F	Ship length
11-20	F	Ship displacement
29-30	I	Number of Stations

DATA SET 6

SECTIONAL PROPERTIES CARD

1-10	F	Section distance from the forward perpendicular
11-20	F	Section waterline breadth
21-30	F	Section area coefficient
31-40	F	Section draft measured from waterline to hull intersection with the centerline
41-50	F	Section centroid measured downwards from the waterline

One card is required for each station starting with the bow proceeding aft. If no entries are given for the section centroid approximate values are calculated based on the area coefficient and draft (using a two-dimensional version of the Moorish Approximation). These cards are normally prepared by STATIC.

DATA SET 7

LATERAL PLANE CARD

<u>Columns</u>	<u>Format</u>	<u>Entry</u>
1-10	F	Ship's vertical center of gravity measured from waterline positive upwards
11-20	F	Radius of gyration in roll

DATA SET 8

SUMMARY MASS PROPERTIES CARD

<u>Columns</u>	<u>Format</u>	<u>Entry</u>
1-10	F	Radius of gyration in pitch (longitudinal)
11-20	F	Ship's longitudinal center of gravity measured from a mid-ships (positive forward)

This card is used only if the mass input option tag, M is 1.

DATA SET 9

SECTIONAL MASS PROPERTIES CARDS

<u>Columns</u>	<u>Format</u>	<u>Entry</u>
1-10	F	Segment weight or mass (tons or tons-sec ² /ft.)
11-20	F	Segment vertical c.g. (ft.)
21-20	F	Segment roll gyradius (ft.)

These cards are used only if the mass input option tag, M, is 0, in lieu of the summary mass properties card above. One card is used for each section to be specified, in a similar manner as the hull form cards described earlier.

The second entry, the segment vertical center of gravity, is necessary only for lateral bending moment calculations, and is measured positive downwards with respect to the ship's overall vertical center, as specified on the lateral plane data card above. Since it is required that the vertical mass moment integral satisfy the specified overall v.c.g., the input segment v.c.g.'s are shifted by an equal amount, up or down as necessary, to exactly balance the vertical moment for the hull. This minimizes the effort required to obtain precise balance in input data preparation. The third card entry, the segment roll gyradius, is needed only for torsional moment calculations. If no entries are given, the overall ship value is used at each segment.

DATA SET 10

MOMENT STATION CARD

<u>Column</u>	<u>Format</u>	<u>Entry</u>
1-2	I	First station for moment calculations
3-4	I	Last station for moment calculations
5-6	I	Increment between stations
11-20	I	Total resistance variation at first speed (mass time)/length
21-30	F	Total resistance variation at second speed (mass time)/length
31-40	F	Total resistance variation at third speed (mass time)/length

The parameters on this card determine where along the ship hull the moment calculations are to be performed. Station numbers are defined as zero at the forward end of the first segment, increasing to N, the number of the segment at the after end of the ship. If the calculations are required only at one station, then the first two entries on the card should be equal to that station number.

It is possible to input four total resistance variation

values corresponding to four speeds. If the program during execution performs more than four speeds in a run, then the fourth value of total resistance variation is used. If the resistance variation is not known, the surge procedure can still be run with this value as zero.

DATA SET 11

SLAMMING, SHIPPING OF WATER
AND PROPELLER EMERGENCE CARD

<u>Columns</u>	<u>Format</u>	<u>Entry</u>
1-10	F	Depth to main deck at forward perpendicular (measured from baseline)
11-20	F	Distance to center of the propeller from the ship's baseline
21-30	F	Diameter of propeller

This card is used only if the slamming, shipping of water and propeller emergence option control tag, I, is 1.

DATA SET 12

INPUT COORDINATE POINT CARDS

<u>Columns</u>	<u>Format</u>	<u>Entry</u>
1-10	F	X-coordinate (measured aft from the forward perpendicular)
11-20	F	Y-coordinate (measured toward starboard from centerline)
21-30	F	Z-coordinate (measured upward from baseline)
31-32	I	Point Number

Input acceleration points are calculated only if acceleration control tag (H) is greater than 0. One card is read for each point specified in Option H. Points are used for calculation of vertical, lateral, and longitudinal accelerations and relative vertical motions, velocities, and accelerations. If no point number is given, the program assigns them sequentially starting with 1. Maximum number of points is 30.

DATA SET 13

RUN CONTROL TAG

Columns

Format

Entry

1-10

F

Run control tag

The run card determines the program continuity. If it is greater than zero, the program executes; if less than zero, the program terminates execution.

DATA SET 14

SHIP SPEED CARDS

Ship speed may be input in either of two ways, depending on the speed option control tag (P). To obtain RAO's for a range of vessel speeds, i.e., possibly to compare with model test results, it is possible to input a range and increment of speeds (P=0) or a number of discrete values (P=1). The speeds should be consistent with control Option C in either knots or distance per second. Maximum of 20 speeds for the two possible choices of Option (P) the input is as follows:

(a) For P=0

Columns

Format

Entry

1-10

F

Initial ship speed

11-20

F

Final ship speed

21-30

F

Increment of ship speed

(b) For P=1 (two or more cards)

1. 4-5

I

Number of ship speeds

2. 1-10

F

First ship speed

11-20

F

Second ship speed

21-30

F

Third ship speed

Repeat card (2) for more than eight speed entries

DATA SET 15

FREQUENCY CARDS

The data read from this card is dependent upon the frequency control option tag (Q). This data can be inputted as frequency in radians per second or hertz, or as wave lengths depending

on wave frequency option control tag (E). Maximum of 34 frequencies. For the three possible choices of this option (Q) the input is as follows:

(a) For Q=0

No input card, program assumes a frequency range of 0.20 to 1.85 in 0.05 radian/second increments.

(b) For Q=1

<u>Columns</u>	<u>Format</u>	<u>Entry</u>
1-10	F	First wave frequency (or wave length)
11-20	F	Last wave frequency (or wave length)
21-30	F	Increment of wave frequency (or wave length)

(c) For Q=2 (read two or more cards)

1.	1-5	F	Number of wave frequencies (or wave lengths)
2.	1-10	F	First wave frequency (or wave length)
	1-20	F	Second wave frequency (or wave length)
	21-30	F	Third wave frequency (or wave length)
	:	:	:

Repeat card (2) for more than 8 frequency entries.

DATA SET 16

WAVE ANGLE CARD

The data read from this card is dependent upon the heading control option control tag (R). Maximum of 25 wave headings. For the three possible choices of this option (R) the input is as follows:

(a) For R=0

No card necessary, the program assumes a wave heading range of 0 degrees (following seas) to 180 degrees (head seas) in 15

degree increments.

(b) For R=1

<u>Columns</u>	<u>Format</u>	<u>Entry</u>
1-10	F	First wave angle
11-20	F	Last wave angle
21-30	F	Increment in wave angle

(c) For R=2 (read two or more cards)

1.	1-5	I	Number of wave angles
2.	1-10	F	First wave angle
	11-20	F	Second wave angle
	21-30	F	Third wave angle
	:	:	:

Repeat card (2) for more than 8 heading entries

DATA SET 17

ROLL DAMPING CARD

The data read from these cards is dependent upon the roll damping option control tag (J). For the two possible choices of this option (J) the input is as follows:

(a) For J=0

<u>Columns</u>	<u>Format</u>	<u>Entry</u>
1-10	F	Fraction of critical roll damping

The calculated roll frequency is increased so that the total damping is the specified fraction of the critical damping. The additional roll damping is then used for all subsequent calculations.

(b) For J=1

<u>Card 1</u>	<u>Columns</u>	<u>Format</u>	<u>Entry</u>
IBILGE	1-2	I	Integer specifying ship has no bilge keels (0) or ships has bilge keels (1)
IB1	3-4	I	First station number for bilge keel

<u>Card 1</u>	<u>Columns</u>	<u>Format</u>	<u>Entry</u>
IB2	5-6	I	Last station number for bilge keel
IMOD	7-8	I	Control for type of flow around hull. If equal to 0 turbulent flow is assumed, if 1, laminar flow is assumed.

If IBILGE is equal to 1, the next set of cards are read for stations IB1 to IB2. (see figure)

Card 2

1-10	F	First station's bilge keel height above baseline
11-20	F	Second station's bilge keel height above baseline
21-30	F	Third station's bilge keel height above baseline
⋮		

Use additional cards if necessary (up to 8 on one card).

Card 3

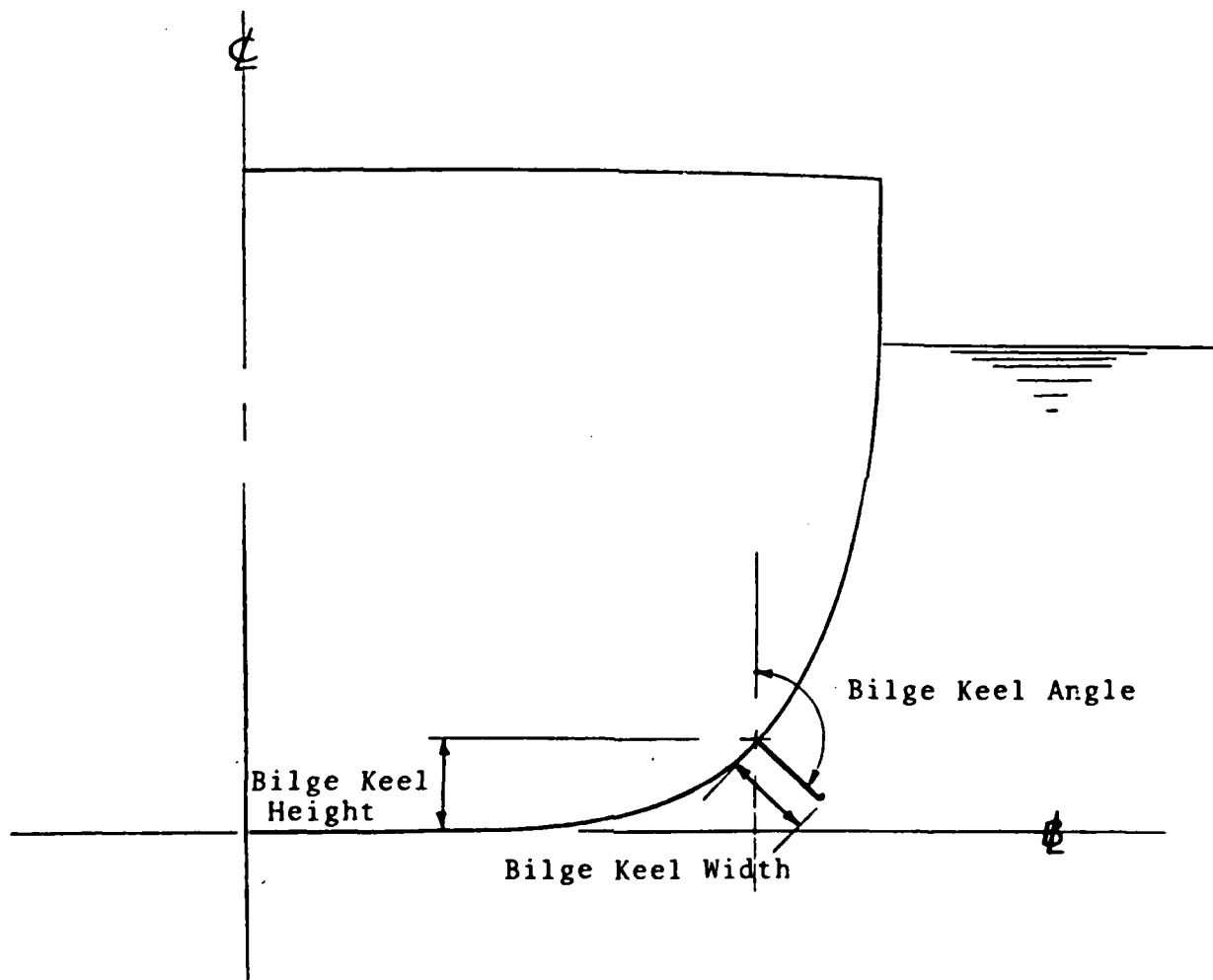
1-10	F	1st station's bilge keel width
11-20	F	2nd station's bilge keel width
21-30	F	3rd station's bilge keel width
⋮		

Use additional cards if necessary (up to 8 on one card).

Card 4

1-10	F	Angle of bilge keel at 1st station
11-20	F	Angle of bilge keel at 2nd station
21-30	F	Angle of bilge keel at 3rd station

Use additional card if necessary (up to 8 on each card)



Spectral Wave Input Cards

The wave input is controlled by the wave option control tag (D). The short term responses can either be calculated for individual spectra or groups of spectra. The latter will be referred to as a spectral family. The spectral family may contain up to 15 groups of spectra, usually formulated on the basis of significant wave height. Within each group there can be up to 12 individual spectra so that a short term response, RMS, and standard deviation are calculated for each group.

DATA SET 18

MATHEMATICAL SPECTRA

Card 1

<u>Columns</u>	<u>Format</u>	<u>Entry</u>
4-5	I	Number of wave spectra groups
9-10	I	Specifies whether there are more than one spectra in each group, if equal to 1, more than one spectra in a group.

If one spectra per group

Card 2

1-10	F	First group wind speed (significant wave height)
11-20	F	Second group wind speed (significant wave height)
21-30	F	Third group wind speed (significant wave height)
⋮	⋮	⋮

If more than 8 wave groups use a second card.

Card 3 - Only if wave control tag = 3, 4 8, or 9

1-10	F	First group mean period (T_1)
11-20	F	Second group mean period (T_1)
21-30	F	Third group mean period (T_1)
⋮	⋮	⋮

If more than 8 spectra within group, use second card.

Card 4 - Only if wave control card = 4 or 9

<u>Columns</u>	<u>Format</u>	<u>Entry</u>
1-10	F	Gamma for first JONSWAP wave group
11-20	F	Gamma for second JONSWAP wave group
21-30	F	Gamma for third JONSWAP wave group
:	:	:

If more than 8 wave groups, use a second card.

If more than one spectra per group

The following sets of cards are repeated for each wave group.

Card 2

1-10	F	Wind speed (significant wave height) for first wave spectrum in group
11-20	F	Wind speed (significant wave height) for second wave spectrum in group
21-30	F	Wind speed (significant wave height) for third wave spectrum in group
:	:	:

If more than 8 spectra within group, use a second card.

Card 3 - Only if wave control tag = 3, 4, 8, or 9

1-10	F	Mean period (T_1) for first wave spectrum in group
11-20	F	Mean period (T_1) for second wave spectrum in group
21-30	F	Mean period (T_1) for third wave spectrum in group
:	:	:

If more than 8 spectra within group, use a second card.

Card 4 - Only if wave control card = 4 or 9

<u>Columns</u>	<u>Format</u>	<u>Entry</u>
1-10	F	Gamma for first JONSWAP wave spectrum in group
11-20	F	Gamma for second JONSWAP wave spectrum in group
21-30	F	Gamma for third JONSWAP wave spectrum in group
⋮	⋮	⋮

If more than 8 spectra within group, use a second card.

DATA SET 19

HEADING PROBABILITY

This card is read only if the heading probability option control tag (N) is not zero. If the tag is zero, an equal probability of heading is assumed to calculate the average root-mean-square and standard deviation for each group and also for the long term calculations. If the option tag is equal to 1, the percentage of heading is read for two times the number of wave angles minus two values. This is to consider both sides of the ship in the short term and long term analysis while generally the transfer functions consider only one side of the ship. If the heading angles are considered, θ_i $i = 1$ to N (i.e., 0° to 180° in steps of 15°), the remaining angles are

$$\theta_i = 360^\circ - \theta_{2N-i} \quad \text{for } i = N + 1 \text{ to } 2N - 2$$

(i.e., 195° to 345° in steps of 15°) Note that 180° represents the head sea condition.

<u>Columns</u>	<u>Format</u>	<u>Entry</u>
1-10	F	Heading probability for first wave angle
11-20	F	Heading probability for second wave angle
21-30	F	Heading probability for third wave angle
⋮	⋮	⋮

If more than 8 entries, use a second card.

DATA SET 20

WAVE GROUP DISTRIBUTION

Each area location in the oceans has a different distribution of wave groups. These cards are read only if option control tag (O) is not zero. This distribution is used in combining the short term results to calculate long term results. If long term results are desired, the input cards are as follows:

Card 1

<u>Columns</u>	<u>Format</u>	<u>Entry</u>
1-24	A	Location or routing description

Card 2

1-10	F	First group percentage
11-20	F	Second group percentage
21-30	F	Third group percentage
:	:	:

If more than 8 groups, use a second card.

DATA SET 21

SPREADING FUNCTION CARD

This card is read only if directionality option control tag (L) is 2. The power of the cosine spreading function and the spreading is read. In a narrow or restricted waterway, the spreading might be less than $\pm 90^\circ$. The data is entered as follows:

<u>Columns</u>	<u>Format</u>	<u>Entry</u>
1-10	F	Spreading of waves
11-20	F	Power of the cosine spreading function

DATA SET 22

LONG TERM LIMITS

4-5	I	Number of long term calculation time periods
11-20	F	Number of hours for first long term calculation
21-30	F	Number of hours for second long term calculation

DATA SET 22 (cont')

<u>Columns</u>	<u>Format</u>	<u>Entry</u>
31-40	F	Number of hours for third long term calculation

Maximum of ten input times.

DATA SET 23

RESPONSE CONTROL CARDS

These cards control the printing and execution of the program. Each line of data consists of 10 integer values as follows:

<u>Name</u>	<u>Column</u>	<u>Format</u>	<u>Entry</u>
IZ	1-2	I	Type of response desired
IMOT	3-4	I	Specified motion, whether displacement velocity or acceleration
IR	5-6	I	Transfer function print option
IS	7-8	I	Short term output option
IL	9-10	I	Long term output option
IPLRAO	11-12	I	Transfer function plot control
IPLSTM	13-14	I	Short term results plot control
J1	15-16	I	First index of motion coordinates for stations number for above calculation
J2	17-18	I	Last index of motion coordinates or station number for above calculation
JINC	19-20	I	Increment of motion coordinate or station number for above calculation

Entry 1 - IZ - Response Type

<u>IZ</u>	<u>Response</u>
1	Heave motion
2	Pitch motion
3	Surge motion
4	Sway motion
5	Yaw motion
6	Roll motion

<u>IZ</u>	<u>Response</u>
7	Vertical bending moment
8	Lateral bending moment
9	Torsional moment
10	Vertical shear force
11	Lateral shear force
12	Vertical motion at forward perpendicular
13	Vertical motion at ship's center of gravity
14	Vertical motion at after perpendicular
15	Vertical motion at port or starboard side of vessel
16	Relative vertical motion at forward perpendicular
17	Relative vertical motion after perpendicular
18	Vertical motion of input coordinate point starboard side of ship
19	Vertical motion of input coordinate points port side of ship
20	Lateral motion of input coordinate points
21	Longitudinal motion of input coordinate points
22	Relative vertical motion of input coordinate points
23	Slamming and shipping of water for input coordinate points
99	Program terminates

Entry 2 - IMOT - Motion Type

- | | |
|---|---|
| 1 | Specifies displacement response, i.e., heave displacement, relative vertical displacement, etc. |
| 2 | Specifies velocity, i.e., heave velocity, relative vertical, etc. |

Entry 2 - IMOT - Motion Type (cont')

<u>IZ</u>	<u>Response</u>
3	Specifies acceleration, i.e., heave acceleration, relative vertical acceleration

Entry 3 - IR - Transfer function print option

0	Do not print transfer functions
1	Print transfer functions

Entry 4 - IS - Short Term Print Option

0	Do not print short term responses
1	Print detailed short term results for all heading and wave heights
2	Abbreviated short term printout for just wave height groups

Entry 5 - IL - Long Term Print Option

0	Do not print or calculate long term results
1	Print and calculate long term results

Entry 6 - IPLRAO - Transfer Function Plot Option

0	Do not plot transfer functions
> 1	If one plot transfer functions for every wave angle. If two, plot every other wave angle, etc.

Entry 7 - PPLSTM - Short Term Plot Option

0	Do not plot short term results
> 1	If one, plot short term results for every wave angle. If two, plot every other wave angle, etc.

Entry 8 - J1 - First Index Number

First index for motion calculation using coordinate points or moment and force calculations using station numbers. If it is equal to zero, J1=1 is assumed for coordinate points or J1=MINKR1 from Data Set 10 is assumed for bending moment and shear force calculation.

Entry 9 - J2 - Last Index Number

Last index for motion calculations using coordinate points or moment and force calculations using station numbers. If it is equal to zero, J2=NPTS from option control tag, H, Data Set 3 for last coordinate point or last station, J2MAXKR1 from Data Set 10 is assumed for bending moment and shear force calculations.

Entry 10 - JINC - Index Increment

Index increment for motion calculations using coordinate points or moment and force calculations using station numbers. If it is equal to zero, JINC=1 for coordinate motion calculations and JINC=INCRES from Data Set 10 for bending moment and shear force calculations.

C. Spectral Data

The extension of the regular wave results to short term values by means of linear superposition requires an energy spectrum. Program SCOMOT has the capability of calculating several forms of analytical spectra and also of reading a spectral data file. Wave data representing typical ocean areas such as India (11), Papa (12), and Kilo (13) as well as hindcast and forecast information are available for a more realistic appraisal of a vessel's short term responses. A common way of representing this information is dividing the total sample into wave height groups and then selecting a limited sample of spectra to represent the total group so that computational time will be reduced. The format of this input will be as follows:

<u>Data Set</u>	<u>Columns</u>	<u>Format</u>	<u>Entry</u>
1	1-32	A	Spectra name or location
2	9-10	I	Number of wave height groups (maximum of 15)
	11-20	F	Acceleration of gravity for spectra so that units are determined
3	9-10	I	Number of frequencies (maximum of 50)
4	1-10	F	First spectral frequency
	11-20	F	Second spectral frequency
	21-30	F	Third spectral frequency
	:	:	:

If more than 8 frequencies continue with additional cards.

For each wave height group repeat the following two data sets (5 & 6)

5	1-10	F	Wave height of this group
	19-20	I	Number of spectral in this group (maximum of 12)

<u>Data Set</u>	<u>Columns</u>	<u>Format</u>	<u>Entry</u>
5	21-30	F	Percent of occurrence of this wave height group

For each spectra in this group read:

6	1-10	F	First spectral ordinate
	11-20	F	Second spectral ordinate
	21-30	F	Third spectral ordinate
	:	:	:

If more than eight frequencies continue with additional cards.

The spectral frequencies are given in radius per second and the the inputted accelerations of gravity on Data Set 2. The spectral ordinates are interpolated to the ship's response amplitude operator frequencies and the units are also converted (i.e., feet to meters). An example spectral data file for the Great Lakes can be seen below:

GREAT LAKES SPECTRA

6	32.17400					
34						
0.20000	0.30000	0.40000	0.50000	0.60000	0.70000	0.80000
0.90000	1.00000	1.10000	1.20000	1.30000	1.40000	1.50000
1.60000	1.70000	1.80000	1.90000	2.00000	2.10000	2.20000
2.30000	2.40000	2.50000	2.60000	2.70000	2.80000	2.90000
3.00000	3.10000	3.20000	3.30000	3.40000	3.50000	
5.4279	3	0.88320				
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.23750
2.13750	1.91250	3.26250	3.03750	2.47500	1.01250	1.12500
0.56250	0.56250	0.40500	0.36000	0.27000	0.22500	0.22500
0.18000	0.11250	0.11250	0.11250	0.06750	0.02250	0.04500
0.02250	0.00000	0.00000	0.00000	0.00000	0.00000	
0.00000	0.00000	0.00000	0.00000	0.00000	0.36000	3.31200
5.76000	3.24000	2.30400	1.72800	1.44000	0.57600	0.86400
0.57600	0.43200	0.18720	0.18720	0.18720	0.18720	0.17280
0.14400	0.14400	0.14400	0.00000	0.00000	0.00000	0.00000
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.11250	0.45000	1.80000	4.38750	2.81250	1.12500	0.56250
0.45000	0.33750	0.33750	0.33750	0.15750	0.18000	0.13500
0.11250	0.11250	0.09000	0.09000	0.09000	0.06750	0.06750
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	

8.1274	3	0.09150				
0.00000	0.00000	0.00000	0.00000	0.00000	0.56250	2.25000
12.37500	6.75000	4.50000	2.92500	2.25000	0.90000	1.12500
1.12500	0.90000	0.67500	0.45000	0.45000	0.22500	0.22500
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
0.00000	0.00000	0.00000	5.85000	3.37500	2.81250	1.35000
1.57500	4.72500	6.18750	9.00000	5.40000	2.81250	1.68750
1.12500	0.90000	0.67500	0.45000	0.45000	0.33750	0.29250
0.29250	0.27000	0.22500	0.11250	0.11250	0.11250	0.11250
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.79200
3.60000	7.77600	6.12000	5.76000	5.76000	1.44000	1.15200
0.57600	1.08000	0.50400	0.36000	0.36000	0.17280	0.14400
0.14400	0.11520	0.07200	0.00000	0.00000	0.00000	0.00000
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
10.3388	3	0.02040				
0.00000	0.00000	0.00000	0.00000	0.72000	2.73600	8.64000
12.96000	8.35200	5.76000	3.02400	4.53600	2.52000	1.87200
1.15200	0.43200	0.57600	0.14400	0.43200	0.43200	0.14400
0.14400	0.14400	0.14400	0.07200	0.07200	0.00000	0.00000
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
0.00000	0.00000	0.00000	0.36000	5.40000	10.08000	11.16000
9.21600	5.04000	6.19200	3.09600	3.24000	2.16000	1.08000
0.72000	0.54720	0.43200	0.36000	0.28800	0.28800	0.21600
0.14400	0.14400	0.14400	0.14400	0.14400	0.00000	0.00000
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
0.00000	0.00000	0.00000	1.15200	12.96000	18.00000	17.28000
11.52000	10.08000	3.45600	2.88000	1.44000	1.15200	1.44000
1.00800	0.86400	0.57600	0.28800	0.14400	0.14400	0.14400
0.14400	0.07200	0.07200	0.00000	0.00000	0.00000	0.00000
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
14.1593	3	0.00380				
0.00000	0.00000	0.00000	3.15000	18.00000	23.40000	10.80000
9.56250	8.32500	7.42500	4.50000	3.15000	2.47500	2.02500
1.12500	0.45000	0.67500	0.45000	0.22500	0.22500	0.22500
0.22500	0.11250	0.11250	0.11250	0.11250	0.04500	0.02250
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
0.00000	0.00000	0.56250	10.12500	12.82500	15.75000	21.37500
11.47500	9.56250	8.77500	4.95000	6.07500	1.68750	1.39500
1.12500	1.12500	0.90000	0.67500	0.56250	0.56250	0.45000
0.33750	0.22500	0.22500	0.22500	0.22500	0.18000	0.15750
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
0.00000	0.00000	0.00000	0.00000	14.40000	61.92000	48.96000
11.52000	5.76000	5.47200	4.03200	1.87200	4.46400	1.72800
1.00800	0.43200	0.14400	0.72000	0.72000	0.72000	0.72000
0.72000	0.72000	0.57600	0.43200	0.28800	0.14400	0.00000
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	

20.5053	3	0.00090				
0.00000	0.00000	11.25000	56.25000	78.75000	48.37500	33.75000
13.95000	19.12500	9.22500	5.62500	4.50000	2.92500	2.70000
1.12500	1.12500	0.32400	0.90000	0.67500	0.45000	0.22500
0.15750	0.11250	0.09000	0.06750	0.04500	0.02250	0.02250
0.02250	0.00000	0.00000	0.00000	0.00000	0.00000	
0.00000	0.00000	0.00000	0.00000	28.80000	90.72000	43.20000
25.92000	10.08000	7.20000	4.32000	3.60000	2.88000	1.44000
1.44000	1.44000	1.29600	1.15200	1.00800	0.86400	0.72000
0.57600	0.43200	0.28800	0.14400	0.00000	0.00000	0.00000
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
0.00000	0.00000	0.00000	61.87500	84.37500	39.37500	12.37500
23.62500	15.75000	8.55000	6.75000	3.15000	2.25000	2.25000
2.25000	1.57500	1.12500	0.90000	0.67500	0.45000	0.22500
0.22500	0.22500	0.22500	0.22500	0.22500	0.22500	0.22500
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
29.2754	3	0.00020				
0.00000	0.00000	1.17023	8.27606	55.80913	115.52696	79.52720
39.54649	29.12303	24.80403	22.27055	19.90596	16.64862	12.42610
7.76935	5.04284	3.42624	3.42624	2.71445	2.20775	0.00000
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
0.06273	0.74074	2.65413	11.66611	110.17053	155.24234	99.84340
57.32914	28.56805	28.25440	20.30408	16.21431	11.26798	9.42210
8.22779	5.94766	4.58440	3.42624	2.71445	1.71312	0.00000
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
0.15684	1.25468	3.59514	18.33762	129.88346	157.92061	78.29670
39.95670	37.97816	31.65651	21.42604	12.52266	9.79614	8.56560
6.85248	5.13936	5.13936	3.42624	3.42624	1.71312	0.00000
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	

)

IV. DESCRIPTION OF OUTPUT SCHEME

A description of the output format will be given with a sample run shown in Appendix A, using the input file given below. The name of this file is DMTEMP where DM stands for Datafile Motions and TEMP is a descriptor for defining the present example.

08/01/80. 09.22.39.
LIST OF DMTEMP

TDPSL7F	RAOSL7F	SPENAME			DATA SET 1
SL-7 - NORMAL FULL LOAD DEPARTURE					DATA SET 2
0 4 0 3 0 0 0 0 0 0 1 0 0 0 1 0 0 0					DATA SET 3
FEET	L.TONS	32.1740	.0285714	1.1057E-05	DATA SET 4
880.5000	47727.65	21			DATA SET 5
0.0000	6.8217	1.0000	32.5905	22.2506	
44.0250	6.0099	1.7202	32.6084	19.1009	
88.0500	15.8877	.9570	32.6264	16.8238	
132.0750	29.0487	.7593	32.6444	14.9912	
176.1000	44.8461	.7117	32.6624	14.0373	
220.1250	60.5858	.7220	32.6803	13.8515	
264.1500	75.1694	.7543	32.6983	14.1066	
308.1750	87.5194	.8027	32.7163	14.4761	
352.2000	97.0852	.8514	32.7343	14.9014	
396.2250	103.1777	.8944	32.7523	15.2506	
440.2500	105.4993	.9331	32.7702	15.5470	DATA SET 6
484.2750	105.5000	.9460	32.7882	15.6588	
528.3000	105.5000	.9344	32.8062	15.5500	
572.3250	105.5000	.9047	32.8242	15.2558	
616.3500	105.5000	.8493	32.8421	14.7393	
660.3750	103.2483	.7761	32.8601	13.9642	
704.4000	95.5739	.6947	32.8781	13.0293	
748.4250	83.7448	.5989	32.8961	11.9877	
792.4500	66.9123	.4948	32.9141	10.8378	
836.4750	44.8880	.5134	21.9084	7.8858	
880.5000	19.1267	.6031	6.7033	2.6247	
9.5145	37.3100				DATA SET 7
389.1025	0.0000	0.0000			
792.4049	0.0000	0.0000			
1243.8223	0.0000	0.0000			
1034.9353	0.0000	0.0000			
1681.7071	0.0000	0.0000			
2040.0422	0.0000	0.0000			
2508.4206	0.0000	0.0000			DATA SET 9
2578.8111	0.0000	0.0000			
3053.3377	0.0000	0.0000			
3591.3250	0.0000	0.0000			
3530.8231	0.0000	0.0000			
3175.7759	0.0000	0.0000			
3725.5737	0.0000	0.0000			

3725.5737	0.0000	0.0000							
3530.6277	0.0000	0.0000							
2595.3904	0.0000	0.0000							DATA SET 9
3151.4265	0.0000	0.0000							
2534.0626	0.0000	0.0000							
1915.6687	0.0000	0.0000							
1761.7314	0.0000	0.0000							
1430.9584	0.0000	0.0000							
1494.0527	0.0000	0.0000							
1010 1									DATA SET 10
1.0000									DATA SET 13
25.0000									DATA SET 14
0.0900									DATA SET 17
10									
2.4129	4.9325	7.3858	10.5710	13.9410	18.0000	23.6566	28.9330		
37.2166	47.6925								DATA SET 18
6.9962	7.4339	8.2753	8.2770	8.8778	8.6434	9.3472	9.9297		
11.2107	11.4870								
NORTH ATLANTIC ROUTING									
11.21001	36.52396	25.91602	13.48993	7.54400	2.23254	2.12576	0.74077		DATA SET 20
0.01212	0.00290								
4	8.0000	24.0000	48.0000	72.0000					DATA SET 22
1 1 1 2 1 0 0									
2 1 1 2 1 0 0									
3 1 1 2 1 0 0									
4 1 1 2 1 0 0									
5 1 1 2 1 0 0									
6 1 1 2 1 0 0									DATA SET 23
7 1 1 2 1 0 0									
8 1 1 2 1 0 0									
9 1 1 2 1 0 0									
10 1 1 2 1 0 0									
11 1 1 2 1 0 0									
09									

The output can either be printed or plotted. The program option in Data Set 23 allows for the plotting of response amplitude operators as a function of heading and frequency and short term results as a function of heading and wave height. These plots are performed on a ZETA plotter at UCS center.

The printed output from SCOMOT depends on the option control tags set in data set 3 and the response selection from data set 23. Each output section will be described and can be seen in the sample output. The output is paginated for ease in binding and to facilitate the incorporation of output into reports. Each page has the program name, date and time of run, ship title and other descriptive headers.

The first part of the output is a listing of the basic input geometric and weight data (Page A1 to A2 of Appendix A). This is followed by the computed geometric and weight properties (page A3) and point motions data. The conditional cards for defining the speeds, headings and frequencies are given (Page A4). The output for the viscous roll damping is dependent upon which option is selected. If the simpler option is selected a natural roll frequency and added viscous roll damping is calculated. The other option displays hull properties and bilge keel description. The wave spectra and properties, probability of heading, type of sea spectrum and probability of each wave height group is printed (Page A5 to A6).

A table of frequency of encounter for various wave frequencies and wave lengths is outputted (Page A7 to A8). For each response selected in data set 23 the response amplitude operators, the short term values and long term statistics are printed (A9 to A73). Slamming, shipping of water and racing of the propeller statistics would be the final output (not shown). The results mentioned in this paragraph would be repeated for each speed selected.

V. TIMING AND ERROR MESSAGES

The compilation time required for program SCOMOT is 6 cpu with about 64K of core needed to load the program and 56K for execution. The job file for compilation is shown in Table 1, Appendix C. The compiled (binary) version of SCOMOT) is stored in a file called SMOTBIN and can be used for subsequent runs, therefore saving the compilation costs. Table 2, Appendix C, shows the job sequence needed for the execution of program SCOMOT using the compiled program.

The computation time for running Program SCOMOT varies tremendously and is a function of many variables. For computation time, it is convenient to discuss the program in two parts; the response amplitude operator calculation, and the short-term and long term responses.

The time to run regular wave responses are directly proportional to the number of speeds, the number of wave headings, the number of frequencies, and the number of ship sections. The SL-7 with 21 stations, one speed, 13 wave headings and 34 frequencies required 30 cpu for the regular wave response calculation. The short and long term calculations are a function of the number of wave groups, the number of spectra in each group, the number of frequencies, and the number of responses to be investigated. The SL-7 for the same run as above with 10 wave height groups, one spectra in each group, and 11 responses required 8 cpu of computation time in addition to the regular wave responses.

Various error messages may appear in the output and cause program termination. Each will be labeled with the subroutine which found the error, and a brief write-up explaining the error. Some of the messages are given below:

<u>Subroutine</u>	<u>Error No.</u>	<u>Explanation</u>
PRELIMB/C	0	Too many sta wave lengths, wave angles, etc.

<u>Subroutines</u>	<u>Error No.</u>	<u>Explanation</u>
PRELIMB	1	Weight does not equal buoyancy
PRELIMB	2	Integrated buoyancy does not equal given buoyancy
PRELIMB	3	Longitudinal centers of buoyancy and gravity not equal

Array exceedance is caused by inputting more data than permitted. The following is a list of maximum numbers used by SCOMOT and is repeated in Chapter III.

Stations	21
Speeds	20
Wave Headings	25
Wave Frequency	34
Input motion points	30
Wave height groups	15
Spectra per wave height group	12

If a file is to be used by SCOMOT, it must be saved on your user number. An error message will tell you if the program cannot find a file. The most common reason for this error is a misspelling of the file name. The second problem associated with the file manipulation involves an output file. It is not possible to save a file, such as the RAO file, if one already exists on the system with the same name.

VI. REFERENCES

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APPENDIX A

SAMPLE OUTPUT

BASIC INPUT DATA

SL-7 - NORMAL FULL LOAD DEPARTURE

JOB OPTION CONTROL TAGS

```

-----
A  B  C  D  E  F  G  H  I  J  K  L  M  N  O  P  Q  R
-  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
0  4  0  3  0  0  0  0  0  0  -1  0  0  0  1  0  0  C

```

SHIP DATA

SHIP LENGTH = 880.500 FEET
 DISPLACEMENT = 47727.65 L.TONS

ENVIRONMENTAL DATA

WATER DENSITY = .02857 L.TONS/ FEET **3
 ACCEL GRAVITY = 32.1740 FEET /SECOND**2
 K. VISCOSITY = 1.106E-05 FEET **2/SECOND

SHIP SECTION DATA

STATION (FEET)	SECTION BREADTH (FEET)	SECTION AREA COEFFICIENT	SECTION DRAFT (FEET)	SECTION CENTROID (FEET)
0.0000	6.8217	1.0000	32.5905	22.2506
44.0250	6.0099	1.7202	32.6084	19.1009
88.0500	15.8877	.9570	32.6264	16.8238
132.0750	29.0487	.7593	32.6444	14.9912
176.1000	44.8461	.7117	32.6624	14.0373
220.1250	60.5858	.7220	32.6803	13.8515
264.1500	75.1694	.7543	32.6983	14.1066
308.1750	87.5194	.8027	32.7163	14.4761
352.2000	97.0852	.8514	32.7343	14.9014
396.2250	103.1777	.8944	32.7523	15.2506
440.2500	105.4993	.9331	32.7702	15.5470
484.2750	105.5000	.9460	32.7882	15.6588
528.3000	105.5000	.9344	32.8062	15.5500
572.3250	105.5000	.9047	32.8242	15.2558
616.3500	105.5000	.8493	32.8421	14.7393
660.3750	103.2483	.7761	32.8601	13.9642
704.4000	95.5739	.6947	32.8781	13.0293
748.4250	83.7448	.5989	32.8961	11.9877
792.4500	66.9123	.4948	32.9141	10.8378
836.4750	44.8880	.5134	21.9084	7.8858
880.5000	19.1267	.6031	6.7033	2.6247

BASIC INPUT DATA (CONTINUED)

SL-7 - NORMAL FULL LOAD DEPARTURE

LATERAL PLANE DATA

 VERTICAL C.G. (ABOVE W.L.) = 9.5145 FEET
 ROLL GYRADIUS = 37.3100 FEET

SECTIONAL MASS PROPERTIES

SEGMENT WEIGHT (L.TONS)	SEGMENT VERTICAL C.G. (FEET)	SEGMENT ROLL GYRADIUS (FEET)
389.1025	0.0000	37.3100
792.4049	0.0000	37.3100
1243.8223	0.0000	37.3100
1034.9353	0.0000	37.3100
1681.7071	0.0000	37.3100
2040.0422	0.0000	37.3100
2508.4206	0.0000	37.3100
2578.8111	0.0000	37.3100
3053.3377	0.0000	37.3100
3591.3250	0.0000	37.3100
3530.8231	0.0000	37.3100
3175.7759	0.0000	37.3100
3725.5737	0.0000	37.3100
3530.6277	0.0000	37.3100
2595.3904	0.0000	37.3100
3151.4265	0.0000	37.3100
2534.0626	0.0000	37.3100
1915.6687	0.0000	37.3100
1761.7314	0.0000	37.3100
1430.9584	0.0000	37.3100
1494.0527	0.0000	37.3100

MOMENT STATION DATA

 FIRST STATION = 10
 LAST STATION = 10
 STATION INCREMENT = 1

TOTAL RESISTANCE VARIATION

 -0.0000 -0.0000 -0.0000 -0.0000

COMPUTED RESULTS

SL-7 - NORMAL FULL LOAD DEPARTURE

WEIGHT	=	47760.00	L.TONS
DISPLACEMENT	=	47703.13	L.TONS
LONGITUDINAL C.B. (FROM MIDSHIPS)	=	-38.3886	FEET
LONGITUDINAL C.G. (FROM MIDSHIPS)	=	-38.6308	FEET
LONGITUDINAL GYRADIUS	=	213.2567	FEET
METACENTRIC HEIGHT (GM)	=	2.9028	FEET
VERTICAL C.G. (ABOVE KEEL)	=	42.3005	FEET
VERTICAL C.B. (ABOVE KEEL)	=	18.2290	FEET

CONDITIONAL INPUT DATA

SL-7 - NORMAL FULL LOAD DEPARTURE

SHIP SPEEDS (KNOTS)

25.0000

WAVE FREQUENCY (RADIANS/SECOND)

.2000	.2500	.3000	.3500	.4000
.4500	.5000	.5500	.6000	.6500
.7000	.7500	.8000	.8500	.9000
.9500	1.0000	1.0500	1.1000	1.1500
1.2000	1.2500	1.3000	1.3500	1.4000
1.4500	1.5000	1.5500	1.6000	1.6500
1.7000	1.7500	1.8000		

WAVE ANGLE (DEGREES)

0.0000	15.0000	30.0000	45.0000	60.0000
75.0000	90.0000	105.0000	120.0000	135.0000
150.0000	165.0000	180.0000		

ROLL DAMPING DATA

FRACTION OF CRITICAL ROLL DAMPING = 9.0000E-02

NATURAL ROLL FREQUENCY =	.23847
CALCULATED WAVE DAMPING IN ROLL =	.1435E+04
ADDITIONAL VISCOUS DAMPING IN ROLL =	.1031E+06

WAVE SPECTRA INPUT DATA

=====

MATHEMATICAL SPECTRAL FORMULATION - TWO PARAMETER ISSC

GROUP		1
1	SIG. WAVE HT	2.4129
	MEAN PERIOD	6.9962
GROUP		1
2	SIG. WAVE HT	4.9325
	MEAN PERIOD	7.4339
GROUP		1
3	SIG. WAVE HT	7.3858
	MEAN PERIOD	8.2753
GROUP		1
4	SIG. WAVE HT	10.5710
	MEAN PERIOD	8.2770
GROUP		1
5	SIG. WAVE HT	13.9410
	MEAN PERIOD	8.8778
GROUP		1
6	SIG. WAVE HT	18.0000
	MEAN PERIOD	8.6434
GROUP		1
7	SIG. WAVE HT	23.6566
	MEAN PERIOD	9.3472
GROUP		1
8	SIG. WAVE HT	28.9330
	MEAN PERIOD	9.9297
GROUP		1
9	SIG. WAVE HT	37.2166
	MEAN PERIOD	11.2107
GROUP		1
10	SIG. WAVE HT	47.6925
	MEAN PERIOD	11.4870

WAVE SPECTRA INPUT DATA

=====

WEIGHTED PROBABILITY OF HEADING ANGLES

1.00000	1.00000	1.00000	1.00000	1.00000
1.00000	1.00000	1.00000	1.00000	1.00000
1.00000	1.00000	1.00000	1.00000	1.00000
1.00000	1.00000	1.00000	1.00000	1.00000
1.00000	1.00000	1.00000	1.00000	1.00000

SHORT CRESTED SEA SPECTRUM

SPREADING = +/- 90.0000

POWER OF THE COSINE SPREADING FUNCTION = 2.00000

PERCENT OCCURANCE OF EACH WAVE HEIGHT GROUP FOR - NORTH ATLANTIC ROUTING

11.21001	36.52396	25.91602	13.68993	7.54400
2.23254	2.12576	.74277	.01212	.00290

***** END OF WAVE INPUT DATA *****

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

FREQUENCY OF ENCOUNTER FOR VARIOUS HEADINGS (RAD/SEC)

WAVE FREQ.	WAVE/SHIP LENGTH	W A V E A N G L E							
		0.00	15.00	30.00	45.00	60.00	75.00	90.00	
.2000	5.7398	.1475	.1493	.1546	.1629	.1738	.1864	.2000	
.2500	3.6735	.1680	.1708	.1790	.1920	.2090	.2288	.2500	
.3000	2.5510	.1819	.1860	.1978	.2165	.2410	.2694	.3000	
.3500	1.8742	.1893	.1948	.2108	.2364	.2697	.3084	.3500	
.4000	1.4349	.1901	.1973	.2182	.2516	.2951	.3457	.4000	
.4500	1.1338	.1844	.1934	.2200	.2622	.3172	.3813	.4500	
.5000	.9184	.1721	.1832	.2160	.2681	.3360	.4151	.5000	
.5500	.7590	.1532	.1667	.2064	.2694	.3516	.4473	.5500	
.6000	.6378	.1278	.1439	.1910	.2661	.3639	.4778	.6000	
.6500	.5434	.0958	.1147	.1700	.2581	.3729	.5066	.6500	
.7000	.4686	.0573	.0792	.1434	.2455	.3786	.5336	.7000	
.7500	.4082	.0121	.0373	.1110	.2283	.3811	.5590	.7500	
.8000	.3587	-.0395	-.0109	.0730	.2064	.3802	.5827	.8000	
.8500	.3178	-.0977	-.0654	.0292	.1799	.3761	.6047	.8500	
.9000	.2834	-.1625	-.1263	-.0202	.1487	.3687	.6250	.9000	
.9500	.2544	-.2338	-.1935	-.0752	.1129	.3581	.6436	.9500	
1.0000	.2296	-.3117	-.2670	-.1360	.0725	.3441	.6605	1.0000	
1.0500	.2082	-.3962	-.3469	-.2024	.0274	.3269	.6757	1.0500	
1.1000	.1897	-.4872	-.4331	-.2746	-.0223	.3064	.6892	1.1000	
1.1500	.1736	-.5848	-.5257	-.3524	-.0767	.2826	.7010	1.1500	
1.2000	.1594	-.6889	-.6245	-.4358	-.1357	.2556	.7111	1.2000	
1.2500	.1469	-.7996	-.7297	-.5250	-.1993	.2252	.7195	1.2500	
1.3000	.1359	-.9168	-.8413	-.6198	-.2675	.1916	.7262	1.3000	
1.3500	.1260	-1.0406	-.9592	-.7204	-.3404	.1547	.7313	1.3500	
1.4000	.1171	-1.1710	-1.0834	-.8266	-.4180	.1145	.7346	1.4000	
1.4500	.1092	-1.3079	-1.2139	-.9384	-.5001	.0710	.7362	1.4500	
1.5000	.1020	-1.4514	-1.3508	-1.0560	-.5870	.0243	.7361	1.5000	
1.5500	.0956	-1.6014	-1.4941	-1.1792	-.6784	-.0257	.7343	1.5500	
1.6000	.0897	-1.7580	-1.6436	-1.3081	-.7745	-.0790	.7309	1.6000	
1.6500	.0843	-1.9212	-1.7995	-1.4427	-.8752	-.1356	.7257	1.6500	
1.7000	.0794	-2.0909	-1.9617	-1.5830	-.9806	-.1955	.7188	1.7000	
1.7500	.0750	-2.2672	-2.1303	-1.7290	-1.0906	-.2586	.7103	1.7500	
1.8000	.0709	-2.4500	-2.3052	-1.8806	-1.2052	-.3250	.7000	1.8000	

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

FREQUENCY OF ENCOUNTER FOR VARIOUS HEADINGS (RAD/SEC)

WAVE	WAVE/SHIP	W A V E A N G L E					
FREQ.	LENGTH	105.00	120.00	135.00	150.00	165.00	180.00
.2000	5.7398	.2136	.2262	.2371	.2454	.2507	.2525
.2500	3.6735	.2712	.2910	.3080	.3210	.3292	.3320
.3000	2.5510	.3306	.3590	.3835	.4022	.4140	.4181
.3500	1.8742	.3916	.4303	.4636	.4892	.5052	.5107
.4000	1.4349	.4543	.5049	.5484	.5818	.6027	.6099
.4500	1.1338	.5187	.5828	.6378	.6800	.7066	.7156
.5000	.9184	.5849	.6640	.7319	.7840	.8168	.8279
.5500	.7590	.6527	.7484	.8306	.8936	.9333	.9468
.6000	.6378	.7222	.8361	.9339	1.0090	1.0561	1.0722
.6500	.5434	.7934	.9271	1.0419	1.1300	1.1853	1.2042
.7000	.4686	.8664	1.0214	1.1545	1.2566	1.3208	1.3427
.7500	.4082	.9410	1.1189	1.2717	1.3890	1.4627	1.4879
.8000	.3587	1.0173	1.2198	1.3936	1.5270	1.6109	1.6395
.8500	.3178	1.0953	1.3239	1.5201	1.6708	1.7654	1.7977
.9000	.2834	1.1750	1.4313	1.6513	1.8202	1.9263	1.9625
.9500	.2544	1.2564	1.5419	1.7871	1.9752	2.0935	2.1338
1.0000	.2296	1.3395	1.6559	1.9275	2.1360	2.2670	2.3117
1.0500	.2082	1.4243	1.7731	2.0726	2.3024	2.4469	2.4962
1.1000	.1897	1.5108	1.8936	2.2223	2.4746	2.6331	2.6872
1.1500	.1736	1.5990	2.0174	2.3767	2.6524	2.8257	2.8848
1.2000	.1594	1.6889	2.1444	2.5357	2.8358	3.0245	3.0889
1.2500	.1469	1.7805	2.2748	2.6993	3.0250	3.2297	3.2996
1.3000	.1359	1.8738	2.4084	2.8675	3.2198	3.4413	3.5168
1.3500	.1260	1.9687	2.5453	3.0404	3.4204	3.6592	3.7406
1.4000	.1171	2.0654	2.6855	3.2180	3.6266	3.8834	3.9710
1.4500	.1092	2.1638	2.8290	3.4001	3.8384	4.1139	4.2079
1.5000	.1020	2.2639	2.9757	3.5870	4.0560	4.3508	4.4514
1.5500	.0956	2.3657	3.1257	3.7784	4.2792	4.5941	4.7014
1.6000	.0897	2.4691	3.2790	3.9745	4.5081	4.8436	4.9580
1.6500	.0843	2.5743	3.4356	4.1752	4.7427	5.0995	5.2212
1.7000	.0794	2.6812	3.5955	4.3806	4.9830	5.3617	5.4909
1.7500	.0750	2.7897	3.7586	4.5906	5.2290	5.6303	5.7672
1.8000	.0709	2.9000	3.9250	4.8052	5.4806	5.9052	6.0500

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE HEAVE DISPLACEMENT (FEET / FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	0.00 DEG.		15.00 DEG.		30.00 DEG.		45.00 DEG.	
		AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE
.2000	5.7398	.9559	180.0	.9583	180.0	.9651	179.9	.9748	179.9
.2500	3.6735	.9024	-179.9	.9078	-180.0	.9228	180.0	.9444	179.8
.3000	2.5510	.8157	-179.7	.8256	-179.7	.8536	-179.9	.8943	179.8
.3500	1.8742	.6916	-179.1	.7075	-179.2	.7527	-179.5	.8198	179.9
.4000	1.4349	.5342	-178.0	.5562	-178.2	.6204	-178.8	.7189	-179.7
.4500	1.1338	.3578	-176.2	.3842	-176.5	.4640	-177.4	.5934	-179.0
.5000	.9184	.1866	-173.0	.2135	-173.6	.2991	-175.2	.4502	-177.8
.5500	.7590	.1775	-173.1	.2039	-173.6	.1471	-171.5	.3017	-175.9
.6000	.6378	.1653	-173.1	.1906	-173.6	.0299	-161.9	.1637	-173.0
.6500	.5434	.1499	-173.1	.1736	-173.5	.0383	13.0	.0522	-169.0
.7000	.4686	.1313	-173.1	.1529	-173.5	.0362	13.0	.0215	17.4
.7500	.4082	.1096	-173.2	.1286	-173.4	.0336	13.0	.0548	25.3
.8000	.3587	.0847	-173.3	.1006	-173.2	.0306	12.9	.0550	37.3
.8500	.3178	.0566	-173.5	.0689	-172.9	.0272	12.8	.0377	56.5
.9000	.2834	.0254	-174.2	.0335	-171.7	.0233	12.7	.0346	56.6
.9500	.2544	.0090	10.8	.0057	-7.5	.0190	12.5	.0311	56.7
1.0000	.2296	.0079	35.2	.0098	24.6	.0142	12.2	.0272	56.8
1.0500	.2082	.0023	-168.5	.0020	70.8	.0090	11.5	.0228	57.0
1.1000	.1897	.0055	-140.3	.0054	-146.8	.0036	40.6	.0179	57.4
1.1500	.1736	.0026	-175.0	.0031	-151.8	.0041	-164.3	.0126	58.1
1.2000	.1594	.0004	155.9	.0024	115.6	.0042	-149.3	.0069	60.0
1.2500	.1469	.0088	36.9	.0030	-5.8	.0008	141.0	.0008	94.4
1.3000	.1359	.0060	-153.2	.0069	98.0	.0019	53.1	.0039	177.7
1.3500	.1260	.0035	-36.3	.0055	-86.5	.0031	28.2	.0026	-166.2
1.4000	.1171	.0022	62.4	.0016	16.8	.0039	129.5	.0003	-2.7
1.4500	.1092	.0017	173.4	.0020	110.2	.0049	-71.3	.0017	24.0
1.5000	.1020	.0010	-112.4	.0014	-155.5	.0018	24.0	.0017	18.6
1.5500	.0956	.0007	-11.0	.0008	-67.8	.0019	123.4	.0006	22.1
1.6000	.0897	.0007	99.2	.0006	35.6	.0012	-153.1	.0018	-121.8
1.6500	.0843	.0004	-173.5	.0007	128.8	.0009	-56.7	.0038	-103.0
1.7000	.0794	.0005	-43.8	.0004	-114.0	.0006	39.2	.0014	-6.1
1.7500	.0750	.0005	67.5	.0005	-13.2	.0007	129.3	.0021	116.4
1.8000	.0709	.0005	171.0	.0006	105.0	.0006	-121.3	.0011	-156.0

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE HEAVE DISPLACEMENT (FEET / FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	60.00 DEG.		75.00 DEG.		90.00 DEG.		105.00 DEG.	
		AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE
.2000	5.7398	.9855	179.8	.9950	179.8	1.0018	179.7	1.0049	179.7
.2500	3.6735	.9682	179.7	.9892	179.5	1.0034	179.4	1.0088	179.4
.3000	2.5510	.9394	179.5	.9793	179.2	1.0055	178.9	1.0136	178.8
.3500	1.8742	.8959	179.3	.9639	178.6	1.0079	178.1	1.0196	178.0
.4000	1.4349	.8348	179.1	.9413	177.9	1.0104	177.0	1.0276	176.8
.4500	1.1338	.7548	179.0	.9100	176.9	1.0130	175.5	1.0402	175.3
.5000	.9184	.6563	179.0	.8687	175.7	1.0157	173.4	1.0639	173.1
.5500	.7590	.5425	179.1	.8165	174.2	1.0189	170.6	1.1198	169.7
.6000	.6378	.4191	179.5	.7531	172.4	1.0228	166.9	1.2377	162.4
.6500	.5434	.2942	179.8	.6786	170.0	1.0258	161.8	1.4070	144.3
.7000	.4686	.1774	179.6	.5946	167.1	1.0292	154.8	1.2598	110.5
.7500	.4082	.0786	175.3	.5032	163.2	1.0219	144.6	.7238	79.4
.8000	.3587	.0169	106.1	.4082	158.1	.9751	129.7	.3285	64.2
.8500	.3178	.0485	35.5	.3143	150.9	.8273	110.4	.1279	64.2
.9000	.2834	.0669	34.2	.2281	139.9	.5851	91.6	.0421	100.8
.9500	.2544	.0637	39.0	.1576	122.4	.3676	79.1	.0409	160.5
1.0000	.2296	.0462	45.4	.1129	94.5	.2220	73.5	.0480	176.8
1.0500	.2082	.0237	49.5	.0982	60.4	.1338	72.6	.0451	-179.1
1.1000	.1897	.0061	8.7	.1019	33.4	.0816	75.4	.0364	-177.7
1.1500	.1736	.0125	-62.6	.1050	14.5	.0504	81.9	.0258	-176.9
1.2000	.1594	.0168	-54.5	.1006	-4.5	.0323	88.6	.0156	-175.7
1.2500	.1469	.0138	-37.5	.0903	-14.7	.0214	93.7	.0075	-171.5
1.3000	.1359	.0060	-13.3	.0757	-30.5	.0144	93.3	.0020	-144.2
1.3500	.1260	.0056	-14.9	.0611	-48.9	.0099	84.5	.0020	-37.0
1.4000	.1171	.0052	-16.8	.0486	-70.4	.0075	65.3	.0031	-22.8
1.4500	.1092	.0048	-19.3	.0379	-95.4	.0070	43.0	.0028	-20.6
1.5000	.1020	.0044	-22.4	.0332	-123.7	.0075	26.9	.0018	-20.4
1.5500	.0956	.0039	-26.6	.0328	-146.8	.0079	17.5	.0006	-16.8
1.6000	.0897	.0035	-32.1	.0311	-163.7	.0080	12.1	.0004	139.3
1.6500	.0843	.0031	-39.6	.0261	-175.4	.0075	8.8	.0009	142.3
1.7000	.0794	.0027	-49.9	.0174	170.9	.0067	6.6	.0010	137.4
1.7500	.0750	.0020	-20.9	.0093	132.4	.0056	5.1	.0007	127.7
1.8000	.0709	.0011	-19.9	.0115	77.3	.0043	3.8	.0003	101.1

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE HEAVE DISPLACEMENT (FEET / FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	120.00 DEG.		135.00 DEG.		150.00 DEG.		165.00 DEG.	
		AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE
.2000	5.7398	1.0044	179.7	1.0014	179.7	.9975	179.7	.9944	179.7
.2500	3.6735	1.0056	179.4	.9968	179.4	.9864	179.5	.9782	179.6
.3000	2.5510	1.0050	178.9	.9856	179.1	.9639	179.5	.9474	179.8
.3500	1.8742	1.0022	178.3	.9679	179.0	.9320	179.9	.9061	-179.3
.4000	1.4349	1.0006	177.6	.9541	179.3	.9128	-178.8	.8881	-177.3
.4500	1.1338	1.0138	176.8	.9852	179.1	.9823	-179.7	.9876	179.4
.5000	.9184	1.0825	174.5	1.1392	170.9	1.1518	158.5	1.0411	144.6
.5500	.7590	1.2745	163.8	1.1958	134.4	.6414	101.7	.2860	87.8
.6000	.6378	1.3298	129.1	.4692	83.4	.0417	113.9	.0998	-153.6
.6500	.5434	.6884	84.4	.0372	116.1	.1182	-157.8	.1226	-160.8
.7000	.4686	.1827	65.7	.1013	-161.4	.0985	-165.6	.0704	-170.2
.7500	.4082	.0390	157.4	.0942	-166.7	.0509	-173.0	.0224	-178.6
.8000	.3587	.0805	-169.1	.0584	-172.1	.0130	-179.6	.0032	-7.6
.8500	.3178	.0776	-170.5	.0237	-176.8	.0054	-13.8	.0089	-20.4
.9000	.2834	.0560	-173.2	.0019	-157.3	.0084	-23.6	.0050	-45.5
.9500	.2544	.0313	-175.8	.0073	-19.1	.0044	-47.7	.0021	-131.4
1.0000	.2296	.0117	-175.6	.0070	-28.3	.0019	-135.2	.0021	172.3
1.0500	.2082	.0014	-66.6	.0032	-52.7	.0020	169.5	.0006	124.8
1.1000	.1897	.0060	-22.2	.0015	-150.0	.0008	129.9	.0007	-13.1
1.1500	.1736	.0059	-25.7	.0019	161.7	.0006	-6.1	.0005	-54.2
1.2000	.1594	.0033	-36.5	.0009	130.1	.0006	-46.3	.0003	-173.4
1.2500	.1469	.0007	-93.5	.0004	12.6	.0002	-143.8	.0002	125.5
1.3000	.1359	.0014	161.1	.0006	-39.3	.0002	139.4	.0001	-6.6
1.3500	.1260	.0015	140.8	.0003	-90.9	.0001	36.8	.0001	-71.5
1.4000	.1171	.0008	115.5	.0002	160.3	.0001	-57.3	.0002	119.9
1.4500	.1092	.0003	20.9	.0002	101.2	.0001	-152.0	.0000	123.6
1.5000	.1020	.0005	-41.4	.0001	-11.7	.0000	76.3	.0000	-150.4
1.5500	.0956	.0004	-76.4	.0001	-92.2	.0000	-91.3	.0000	63.4
1.6000	.0897	.0002	-154.9	.0000	-167.6	.0000	-162.0	.0001	21.5
1.6500	.0843	.0002	126.5	.0001	67.3	.0001	61.6	.0001	-167.9
1.7000	.0794	.0002	74.3	.0000	-24.2	.0000	-28.8	.0001	88.7
1.7500	.0750	.0001	-7.1	.0001	-132.0	.0001	50.9	.0000	-78.0
1.8000	.0709	.0001	-83.0	.0000	126.5	.0000	94.9	.0001	-138.5

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE HEAVE DISPLACEMENT (FEET / FEET)

W A V E A N G L E

WAVE FREQ.	WAVE/SHIP LENGTH	180.00 DEG. AMPL.	PHASE
.2000	5.7398	.9932	179.7
.2500	3.6735	.9751	179.6
.3000	2.5510	.9414	179.9
.3500	1.8742	.8969	-179.0
.4000	1.4349	.8803	-176.9
.4500	1.1338	.9891	178.6
.5000	.9184	.9752	139.0
.5500	.7590	.1916	36.5
.6000	.6378	.1189	-152.4
.6500	.5434	.1174	-162.2
.7000	.4686	.0597	-171.9
.7500	.4082	.0145	178.9
.8000	.3587	.0062	-9.4
.8500	.3178	.0084	-24.9
.9000	.2834	.0036	-61.1
.9500	.2544	.0023	-156.2
1.0000	.2296	.0017	163.0
1.0500	.2082	.0004	56.2
1.1000	.1897	.0008	-26.4
1.1500	.1736	.0003	-86.7
1.2000	.1594	.0003	159.2
1.2500	.1469	.0001	65.4
1.3000	.1359	.0002	-34.7
1.3500	.1260	.0001	-103.0
1.4000	.1171	.0000	-162.1
1.4500	.1092	.0000	-140.5
1.5000	.1020	.0000	128.1
1.5500	.0956	.0001	45.1
1.6000	.0897	.0001	-179.3
1.6500	.0843	.0005	66.9
1.7000	.0794	.0000	52.1
1.7500	.0750	.0001	-119.2
1.8000	.0709	.0000	80.2

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

SHORT TERM HEAVE DISPLACEMENT (FEET)

WAVE HT. (FEET)	ROOT MEAN SQUARE	BROADNESS EPS	PER HOUR
2.380	2.3892E-01	.39153	800.8
4.879	5.5412E-01	.40328	778.3
7.334	9.9737E-01	.43007	735.6
10.497	1.4279E+00	.43012	735.6
13.867	2.0723E+00	.45084	705.9
17.894	2.5851E+00	.44271	717.4
23.554	3.7331E+00	.46701	683.4
28.835	4.8496E+00	.48638	656.5
37.139	6.8661E+00	.52463	601.8
47.602	8.9415E+00	.53200	590.8

Note:

This is abbreviated Short Term.

When detailed Short Term is specified, the "average" is weighted on basis of heading probability.

LONG TERM RESULTS FOR INDIVIDUAL WAVE HEIGHT GROUPS

WAVE HT. (FEET)	WIDE BAND CORR.	HIGHEST OCCURANCE IN			
		8.0 HRS	24.0 HRS	48.0 HRS	72.0 HRS
2.380	.9609	1.2275E+00	1.3125E+00	1.3647E+00	1.3934E+00
4.879	.9585	2.7864E+00	2.9793E+00	3.0978E+00	3.1630E+00
7.334	.9526	4.8270E+00	5.1595E+00	5.3643E+00	5.4763E+00
10.497	.9526	6.9104E+00	7.3863E+00	7.6795E+00	7.8398E+00
13.867	.9478	9.7912E+00	1.0461E+01	1.0874E+01	1.1099E+01
17.894	.9497	1.2325E+01	1.3170E+01	1.3692E+01	1.3976E+01
23.554	.9439	1.7335E+01	1.8514E+01	1.9242E+01	1.9639E+01
28.835	.9390	2.2065E+01	2.3559E+01	2.4482E+01	2.4984E+01
37.139	.9286	2.9925E+01	3.1946E+01	3.3191E+01	3.3871E+01
47.602	.9265	3.8619E+01	4.1229E+01	4.2834E+01	4.3713E+01

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

LONG TERM HEAVE DISPLACEMENT (FEET)

RESPONSE VALUE	PROBABILITY OF EXCEEDENCE	-LOG OF PROBABILITY	NUMBER IN LIFE	HISTOGRAM
0.	1.0000E+00	0.00	1.0000E+08	0.
3.5507E+00	5.2012E-02	1.28	5.2012E+06	9.4799E+07
7.1015E+00	7.1856E-03	2.14	7.1856E+05	4.4826E+06
1.0652E+01	1.3472E-03	2.87	1.3472E+05	5.8384E+05
1.4203E+01	2.2578E-04	3.65	2.2578E+04	1.1214E+05
1.7754E+01	3.3807E-05	4.47	3.3807E+03	1.9197E+04
2.1304E+01	5.3598E-06	5.27	5.3598E+02	2.8447E+03
2.4855E+01	1.1170E-06	5.95	1.1170E+02	4.2428E+02
2.8406E+01	2.9667E-07	6.53	2.9667E+01	8.2032E+01
3.1957E+01	8.2742E-08	7.08	8.2742E+00	2.1393E+01
3.5507E+01	2.1857E-08	7.66	2.1857E+00	6.0885E+00
3.9058E+01	5.2737E-09	8.28	5.2737E-01	1.6583E+00
4.2609E+01	1.1438E-09	8.94	1.1438E-01	4.1300E-01
4.6160E+01	2.2109E-10	9.66	2.2109E-02	9.2267E-02
4.9710E+01	3.7934E-11	10.42	3.7934E-03	1.8315E-02
5.3261E+01	5.7673E-12	11.24	5.7673E-04	3.2166E-03
5.6812E+01	7.7651E-13	12.11	7.7651E-05	4.9908E-04
6.0362E+01	9.2572E-14	13.03	9.2572E-06	6.8393E-05
6.3913E+01	9.7711E-15	14.01	9.7711E-07	8.2801E-06
6.7464E+01	9.1309E-16	15.04	9.1309E-08	8.8581E-07
7.1015E+01	7.5532E-17	16.12	7.5532E-09	8.3756E-08
7.4565E+01	5.5299E-18	17.26	5.5299E-10	7.0002E-09
7.8116E+01	3.5826E-19	18.45	3.5826E-11	5.1716E-10
8.1667E+01	2.0534E-20	19.69	2.0534E-12	3.3772E-11
8.5218E+01	1.0410E-21	20.98	1.0410E-13	1.9493E-12
8.8768E+01	4.6675E-23	22.33	4.6675E-15	9.9434E-14
9.2319E+01	1.8505E-24	23.73	1.8505E-16	4.4825E-15
9.5870E+01	6.4866E-26	25.19	6.4866E-18	1.7856E-16
9.9421E+01	2.0102E-27	26.70	2.0102E-19	6.2856E-18
1.0297E+02	5.5070E-29	28.26	5.5070E-21	1.9551E-19
1.0652E+02	1.3337E-30	29.87	1.3337E-22	5.3737E-21

INTERPOLATED VALUES

MAXIMUM VALUE IN 10** 4 CYCLES = 1.5726E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 5 CYCLES = 2.0102E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 6 CYCLES = 2.5151E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 7 CYCLES = 3.1430E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 8 CYCLES = 3.7460E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 9 CYCLES = 4.2899E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10**10 CYCLES = 4.7758E+01 (AMPLITUDE)

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE PITCH DISPLACEMENT (DEGREE/ FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	0.00 DEG.		WAVE 15.00 DEG.		ANGLE 30.00 DEG.		45.00 DEG.	
		AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE
.2000	5.7398	.0665	-89.2	.0644	-89.2	.0583	-89.5	.0483	-90.0
.2500	3.6735	.0980	-88.0	.0952	-88.2	.0869	-88.5	.0729	-89.3
.3000	2.5510	.1284	-86.4	.1254	-86.6	.1161	-87.1	.0994	-88.1
.3500	1.8742	.1513	-84.2	.1490	-84.4	.1412	-85.1	.1248	-86.6
.4000	1.4349	.1601	-81.2	.1597	-81.5	.1566	-82.5	.1453	-84.4
.4500	1.1338	.1499	-77.3	.1524	-77.7	.1574	-79.0	.1566	-81.6
.5000	.9184	.1208	-71.9	.1265	-72.5	.1412	-74.3	.1554	-77.9
.5500	.7590	.1156	-71.8	.1214	-72.5	.1099	-68.0	.1404	-73.1
.6000	.6378	.1087	-71.6	.1145	-72.5	.0702	-58.8	.1130	-66.7
.6500	.5434	.0999	-71.4	.1056	-72.4	.0327	-41.9	.0780	-57.6
.7000	.4686	.0893	-71.1	.0948	-72.4	.0307	-41.5	.0426	-43.2
.7500	.4082	.0769	-70.5	.0820	-72.3	.0284	-41.0	.0154	-7.7
.8000	.3587	.0627	-69.7	.0674	-72.2	.0257	-40.3	.0106	91.8
.8500	.3178	.0468	-68.1	.0508	-72.0	.0225	-39.3	.0141	134.5
.9000	.2834	.0292	-64.4	.0322	-71.6	.0190	-37.7	.0132	132.7
.9500	.2544	.0104	-45.6	.0118	-69.4	.0151	-35.0	.0122	130.4
1.0000	.2296	.0077	49.4	.0071	10.1	.0108	-29.9	.0111	127.2
1.0500	.2082	.0088	120.2	.0086	95.4	.0064	-16.7	.0100	123.0
1.1000	.1897	.0058	-157.5	.0065	161.3	.0072	74.6	.0088	117.0
1.1500	.1736	.0068	-63.2	.0058	-97.2	.0063	133.3	.0077	108.5
1.2000	.1594	.0051	25.8	.0058	-21.5	.0044	-135.2	.0067	96.3
1.2500	.1469	.0056	148.7	.0045	89.6	.0049	-56.9	.0061	79.4
1.3000	.1359	.0033	-98.0	.0048	-160.4	.0034	24.5	.0038	143.2
1.3500	.1260	.0018	15.2	.0022	-39.1	.0036	129.2	.0033	-125.2
1.4000	.1171	.0014	78.1	.0014	48.7	.0032	-138.3	.0031	-60.9
1.4500	.1092	.0007	-173.9	.0010	109.3	.0018	-17.9	.0020	11.9
1.5000	.1020	.0006	-94.3	.0007	-133.3	.0013	53.8	.0018	99.9
1.5500	.0956	.0005	2.9	.0005	-54.3	.0008	123.5	.0018	154.8
1.6000	.0897	.0004	95.1	.0005	36.3	.0008	-132.0	.0010	-147.6
1.6500	.0843	.0004	-153.3	.0004	146.6	.0006	-48.4	.0016	-32.1
1.7000	.0794	.0004	-44.3	.0004	-119.3	.0006	40.1	.0015	35.7
1.7500	.0750	.0004	65.0	.0004	-1.7	.0005	144.2	.0010	140.6
1.8000	.0709	.0004	-169.6	.0004	104.1	.0005	-124.9	.0010	-141.6

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE PITCH DISPLACEMENT (DEGREE/ FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	60.00 DEG.		75.00 DEG.		90.00 DEG.		105.00 DEG.	
		AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE
.2000	5.7398	.0348	-90.8	.0185	-92.9	.0012	-156.8	.0181	92.9
.2500	3.6735	.0533	-90.5	.0287	-93.2	.0021	-164.9	.0289	92.6
.3000	2.5510	.0743	-89.9	.0408	-93.4	.0033	-173.1	.0431	91.8
.3500	1.8742	.0966	-88.9	.0545	-93.4	.0048	178.3	.0610	90.1
.4000	1.4349	.1182	-87.6	.0695	-93.3	.0066	169.2	.0836	87.3
.4500	1.1338	.1369	-85.9	.0851	-93.1	.0087	159.6	.1117	83.3
.5000	.9184	.1502	-83.6	.1008	-92.7	.0113	149.2	.1471	77.2
.5500	.7590	.1557	-80.8	.1158	-92.2	.0144	137.6	.1907	68.4
.6000	.6378	.1518	-77.1	.1290	-91.5	.0182	124.3	.2432	55.0
.6500	.5434	.1380	-72.5	.1395	-90.6	.0233	108.9	.2968	33.6
.7000	.4686	.1152	-66.7	.1462	-89.5	.0296	89.0	.2928	2.9
.7500	.4082	.0862	-59.1	.1482	-88.2	.0373	64.3	.2101	-23.7
.8000	.3587	.0549	-48.5	.1449	-86.5	.0442	32.6	.1342	-38.7
.8500	.3178	.0262	-29.5	.1357	-84.5	.0452	-4.6	.0837	-47.3
.9000	.2834	.0088	42.4	.1210	-82.0	.0374	-40.2	.0496	-51.9
.9500	.2544	.0157	120.5	.1013	-78.8	.0272	-67.3	.0267	-53.4
1.0000	.2296	.0201	144.1	.0779	-74.8	.0192	-86.0	.0121	-49.2
1.0500	.2082	.0171	161.4	.0523	-68.9	.0139	-98.9	.0038	-15.1
1.1000	.1897	.0096	178.1	.0274	-58.7	.0102	-108.3	.0040	67.5
1.1500	.1736	.0010	-168.2	.0071	-10.7	.0075	-114.0	.0058	83.3
1.2000	.1594	.0053	38.4	.0152	97.7	.0056	-118.1	.0059	86.0
1.2500	.1469	.0074	61.9	.0265	115.1	.0043	-121.7	.0049	85.5
1.3000	.1359	.0056	96.4	.0311	126.1	.0031	-123.0	.0034	83.5
1.3500	.1260	.0049	94.3	.0288	137.9	.0023	-122.7	.0019	81.0
1.4000	.1171	.0042	91.4	.0212	154.2	.0016	-121.5	.0005	76.5
1.4500	.1092	.0033	86.6	.0114	-170.9	.0011	-117.4	.0004	-104.2
1.5000	.1020	.0025	78.2	.0093	-89.6	.0007	-109.6	.0008	-110.4
1.5500	.0956	.0017	60.6	.0160	-42.7	.0004	-96.8	.0008	-117.3
1.6000	.0897	.0013	22.9	.0206	-18.0	.0003	-76.6	.0006	-127.7
1.6500	.0843	.0017	-18.9	.0206	5.5	.0002	-51.1	.0003	-151.8
1.7000	.0794	.0026	-39.8	.0168	35.9	.0002	-28.5	.0002	118.0
1.7500	.0750	.0019	54.7	.0130	82.7	.0001	-13.5	.0003	71.2
1.8000	.0709	.0015	140.2	.0135	139.2	.0001	-2.7	.0003	51.5

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE PITCH DISPLACEMENT (DEGREE/ FEET)

		W A V E A N G L E							
		120.00 DEG.		135.00 DEG.		150.00 DEG.		165.00 DEG.	
WAVE	WAVE/SHIP	AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE
FREQ.	LENGTH								
.2000	5.7398	.0356	90.6	.0508	89.5	.0626	88.8	.0699	88.4
.2500	3.6735	.0571	89.5	.0815	87.9	.1002	86.8	.1118	86.1
.3000	2.5510	.0849	87.6	.1209	85.1	.1479	83.3	.1645	82.2
.3500	1.8742	.1200	84.6	.1697	80.8	.2058	77.9	.2271	76.0
.4000	1.4349	.1636	79.9	.2286	74.0	.2726	69.2	.2964	65.8
.4500	1.1338	.2171	72.8	.2964	63.2	.3422	54.6	.3604	48.3
.5000	.9184	.2809	61.7	.3637	45.1	.3866	28.2	.3681	15.2
.5500	.7590	.3512	43.5	.3832	12.4	.2779	-15.5	.1885	-30.2
.6000	.6378	.3780	12.6	.2290	-27.2	.0981	-46.7	.0425	-58.0
.6500	.5434	.2601	-22.6	.0884	-49.2	.0112	-68.8	.0143	123.0
.7000	.4686	.1340	-42.8	.0176	-62.0	.0196	110.5	.0258	104.4
.7500	.4082	.0583	-53.4	.0126	107.1	.0229	99.2	.0183	91.9
.8000	.3587	.0169	-56.8	.0202	99.6	.0146	87.7	.0070	73.1
.8500	.3178	.0056	87.0	.0164	91.2	.0049	67.1	.0018	-49.1
.9000	.2834	.0138	95.6	.0088	80.0	.0019	-66.8	.0033	-102.3
.9500	.2544	.0143	91.8	.0021	48.5	.0031	-105.3	.0019	-134.0
1.0000	.2296	.0108	85.9	.0022	-87.3	.0018	-134.7	.0008	129.4
1.0500	.2082	.0058	77.4	.0027	-111.3	.0007	132.6	.0009	70.6
1.1000	.1897	.0016	55.0	.0015	-137.4	.0009	71.2	.0003	9.7
1.1500	.1736	.0013	-86.2	.0006	133.6	.0004	23.2	.0003	-105.8
1.2000	.1594	.0021	-108.4	.0008	69.3	.0003	-95.4	.0002	-162.9
1.2500	.1469	.0016	-124.1	.0005	32.4	.0002	-147.4	.0001	80.2
1.3000	.1359	.0007	-154.9	.0002	-67.3	.0001	108.1	.0001	8.1
1.3500	.1260	.0004	96.6	.0003	-132.8	.0001	27.5	.0001	-122.8
1.4000	.1171	.0006	55.0	.0001	168.8	.0000	-78.0	.0001	116.7
1.4500	.1092	.0004	25.3	.0001	57.3	.0001	178.2	.0000	-42.8
1.5000	.1020	.0002	-41.8	.0001	-10.7	.0000	31.7	.0000	-175.5
1.5500	.0956	.0002	-123.8	.0001	-118.4	.0000	-62.2	.0000	102.0
1.6000	.0897	.0002	-169.2	.0001	156.0	.0000	162.0	.0001	-23.5
1.6500	.0843	.0001	122.0	.0000	52.0	.0000	66.0	.0000	-144.8
1.7000	.0794	.0001	39.6	.0000	-44.6	.0000	-46.8	.0000	67.3
1.7500	.0750	.0001	-19.4	.0000	-146.0	.0001	-138.1	.0000	-29.5
1.8000	.0709	.0001	-90.0	.0000	124.2	.0000	80.0	.0000	-176.0

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE PITCH DISPLACEMENT (DEGREE/ FEET)

W A V E A N G L E

WAVE FREQ.	WAVE/SHIP LENGTH	180.00 DEG. AMPL.	PHASE
.2000	5.7398	.0725	88.3
.2500	3.6735	.1158	85.9
.3000	2.5510	.1700	81.8
.3500	1.8742	.2340	75.3
.4000	1.4349	.3034	64.6
.4500	1.1338	.3644	46.0
.5000	.9184	.3550	10.3
.5500	.7590	.1603	-34.7
.6000	.6378	.0279	-63.3
.6500	.5434	.0197	118.4
.7000	.4686	.0258	102.3
.7500	.4082	.0159	88.7
.8000	.3587	.0047	63.0
.8500	.3178	.0026	-75.2
.9000	.2834	.0032	-109.5
.9500	.2544	.0013	-152.9
1.0000	.2296	.0010	102.7
1.0500	.2082	.0008	57.7
1.1000	.1897	.0003	-47.3
1.1500	.1736	.0003	-123.7
1.2000	.1594	.0001	151.0
1.2500	.1469	.0001	53.4
1.3000	.1359	.0001	-42.2
1.3500	.1260	.0001	-149.7
1.4000	.1171	.0000	-125.9
1.4500	.1092	.0000	-91.0
1.5000	.1020	.0000	135.9
1.5500	.0956	.0000	.3
1.6000	.0897	.0000	-82.6
1.6500	.0843	.0002	-115.0
1.7000	.0794	.0000	-3.0
1.7500	.0750	.0000	-122.4
1.8000	.0709	.0000	123.2

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

SHORT TERM PITCH DISPLACEMENT (DEGREE)

WAVE HT. (FEET)	ROOT MEAN SQUARE	BROADNESS EPS	PER HOUR
2.380	6.0073E-02	.47875	771.5
4.879	1.4125E-01	.47610	754.7
7.334	2.5666E-01	.47790	724.1
10.497	3.6746E-01	.47791	724.1
13.867	5.3024E-01	.48246	703.8
17.894	6.6366E-01	.48047	711.5
23.554	9.4500E-01	.48700	688.8
28.835	1.2037E+00	.49329	671.5
37.139	1.6009E+00	.50805	637.6
47.602	2.0514E+00	.51126	631.0

LONG TERM RESULTS FOR INDIVIDUAL WAVE HEIGHT GROUPS

WAVE HT. (FEET)	WIDE BAND CORR.	HIGHEST OCCURANCE IN			
		8.0 HRS	24.0 HRS	48.0 HRS	72.0 HRS
2.380	.9410	2.7581E-01	2.9449E-01	3.0602E-01	3.1232E-01
4.879	.9416	6.5490E-01	6.9862E-01	7.2551E-01	7.4033E-01
7.334	.9412	1.2371E+00	1.3205E+00	1.3711E+00	1.3996E+00
10.497	.9412	1.7712E+00	1.8907E+00	1.9632E+00	2.0039E+00
13.867	.9400	2.6258E+00	2.8079E+00	2.9199E+00	2.9808E+00
17.894	.9405	3.2547E+00	3.4776E+00	3.6139E+00	3.6893E+00
23.554	.9388	4.7571E+00	5.0940E+00	5.2991E+00	5.4139E+00
28.835	.9372	6.1474E+00	6.5913E+00	6.8583E+00	7.0128E+00
37.139	.9332	8.2881E+00	8.9033E+00	9.2675E+00	9.4806E+00
47.602	.9324	1.0627E+01	1.1419E+01	1.1887E+01	1.2161E+01

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

LONG TERM PITCH DISPLACEMENT (DEGREE)

RESPONSE VALUE	PROBABILITY OF EXCEEDENCE	-LOG OF PROBABILITY	NUMBER IN LIFE	HISTOGRAM
0.	1.0000E+00	0.00	1.0000E+08	0.
1.0247E+00	3.7104E-02	1.43	3.7104E+06	9.6290E+07
2.0493E+00	4.6471E-03	2.33	4.6471E+05	3.2457E+06
3.0740E+00	8.1953E-04	3.09	8.1953E+04	3.8276E+05
4.0986E+00	1.3134E-04	3.88	1.3134E+04	6.8819E+04
5.1233E+00	1.9089E-05	4.72	1.9089E+03	1.1225E+04
6.1479E+00	2.8967E-06	5.54	2.8967E+02	1.6192E+03
7.1726E+00	5.6805E-07	6.25	5.6805E+01	2.3286E+02
8.1973E+00	1.4460E-07	6.84	1.4460E+01	4.2346E+01
9.2219E+00	3.9329E-08	7.41	3.9329E+00	1.0527E+01
1.0247E+01	1.0220E-08	7.99	1.0220E+00	2.9109E+00
1.1271E+01	2.4424E-09	8.61	2.4424E-01	7.7778E-01
1.2296E+01	5.2762E-10	9.28	5.2762E-02	1.9147E-01
1.3321E+01	1.0202E-10	9.99	1.0202E-02	4.2559E-02
1.4345E+01	1.7561E-11	10.76	1.7561E-03	8.4462E-03
1.5370E+01	2.6832E-12	11.57	2.6832E-04	1.4878E-03
1.6395E+01	3.6337E-13	12.44	3.6337E-05	2.3198E-04
1.7419E+01	4.3583E-14	13.36	4.3583E-06	3.1978E-05
1.8444E+01	4.6277E-15	14.33	4.6277E-07	3.8955E-06
1.9468E+01	4.3484E-16	15.36	4.3484E-08	4.1928E-07
2.0493E+01	3.6150E-17	16.44	3.6150E-09	3.9869E-08
2.1518E+01	2.6582E-18	17.58	2.6582E-10	3.3491E-09
2.2542E+01	1.7286E-19	18.76	1.7286E-11	2.4853E-10
2.3567E+01	9.9394E-21	20.00	9.9394E-13	1.6292E-11
2.4592E+01	5.0525E-22	21.30	5.0525E-14	9.4341E-13
2.5616E+01	2.2703E-23	22.64	2.2703E-15	4.8255E-14
2.6641E+01	9.0171E-25	24.04	9.0171E-17	2.1802E-15
2.7666E+01	3.1653E-26	25.50	3.1653E-18	8.7006E-17
2.8690E+01	9.8198E-28	27.01	9.8198E-20	3.0671E-18
2.9715E+01	2.6923E-29	28.57	2.6923E-21	9.5505E-20
3.0740E+01	6.5238E-31	30.19	6.5238E-23	2.6271E-21

INTERPOLATED VALUES

MAXIMUM VALUE IN 10** 4 CYCLES = 4.2435E+00 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 5 CYCLES = 5.4746E+00 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 6 CYCLES = 6.8169E+00 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 7 CYCLES = 8.4875E+00 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 8 CYCLES = 1.0262E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 9 CYCLES = 1.1868E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10**10 CYCLES = 1.3332E+01 (AMPLITUDE)

SPEED = 25.000 KNOTS

REGULAR WAVE SURGE DISPLACEMENT (FEET / FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	W A V E A N G L E							
		0.00 DEG.		15.00 DEG.		30.00 DEG.		45.00 DEG.	
		AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE
.2000	5.7398	1.6826	-89.0	1.5892	-89.0	1.3359	-89.0	.9881	-89.0
.2500	3.6735	1.9159	-88.9	1.7980	-88.9	1.4844	-88.9	1.0694	-88.9
.3000	2.5510	2.1460	-88.6	2.0015	-88.6	1.6248	-88.7	1.1428	-88.8
.3500	1.8742	2.3383	-88.1	2.1689	-88.2	1.7359	-88.4	1.1980	-88.6
.4000	1.4349	2.4407	-87.0	2.2551	-87.2	1.7885	-87.6	1.2219	-88.2
.4500	1.1338	2.3854	-84.8	2.2017	-85.2	1.7467	-86.3	1.1991	-87.5
.5000	.9184	2.0969	-80.2	1.9464	-81.2	1.5743	-83.7	1.1144	-86.1
.5500	.7590	1.9977	-80.0	1.8613	-81.1	1.2460	-78.3	.9575	-83.8
.6000	.6378	1.8639	-79.9	1.7434	-80.8	.7725	-64.4	.7280	-79.3
.6500	.5434	1.6957	-79.6	1.5930	-80.4	.3693	-1.9	.4447	-68.8
.7000	.4686	1.4931	-79.2	1.4100	-79.9	.3463	-.2	.1829	-26.5
.7500	.4082	1.2560	-78.6	1.1946	-79.0	.3188	2.1	.2620	62.2
.8000	.3587	.9848	-77.6	.9472	-77.5	.2873	5.5	.4563	88.0
.8500	.3178	.6798	-75.4	.6686	-74.4	.2527	10.4	.5378	107.7
.9000	.2834	.3438	-68.5	.3637	-65.4	.2165	17.7	.4955	108.4
.9500	.2544	.0926	34.4	.1207	7.2	.1820	29.1	.4471	109.5
1.0000	.2296	.0607	92.4	.0852	74.7	.1560	46.7	.3927	111.0
1.0500	.2082	.0257	167.7	.0378	133.5	.1495	70.4	.3324	113.2
1.1000	.1897	.0219	-111.7	.0248	-133.3	.0639	121.3	.2668	116.8
1.1500	.1736	.0094	-44.8	.0158	-78.8	.0326	-146.5	.1971	123.6
1.2000	.1594	.0099	54.5	.0092	29.9	.0253	-91.2	.1281	138.9
1.2500	.1469	.0038	109.1	.0077	79.7	.0098	-3.9	.0831	-178.6
1.3000	.1359	.0044	-127.9	.0036	-154.1	.0114	69.2	.0643	-106.8
1.3500	.1260	.0015	-31.1	.0032	-101.0	.0038	144.7	.0298	-61.4
1.4000	.1171	.0027	51.1	.0028	30.9	.0054	-120.2	.0167	39.5
1.4500	.1092	.0016	-178.1	.0014	92.0	.0021	-34.7	.0143	89.6
1.5000	.1020	.0013	-119.3	.0021	-150.7	.0031	49.1	.0061	177.5
1.5500	.0956	.0015	8.4	.0010	-37.7	.0014	158.4	.0072	-112.3
1.6000	.0897	.0008	121.1	.0012	36.7	.0017	-133.9	.0032	-41.7
1.6500	.0843	.0009	-151.4	.0011	164.4	.0013	-12.8	.0035	45.5
1.7000	.0794	.0009	-26.5	.0008	-87.7	.0009	61.0	.0017	118.0
1.7500	.0750	.0009	109.7	.0008	11.9	.0011	171.4	.0020	-152.0
1.8000	.0709	.0008	-144.8	.0010	137.5	.0008	-80.5	.0011	-72.5

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE SURGE DISPLACEMENT (FEET / FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	60.00 DEG.		75.00 DEG.		90.00 DEG.		105.00 DEG.	
		AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE
.2000	5.7398	.6178	-89.0	.2791	-89.0	.0000	-8.4	.2126	91.0
.2500	3.6735	.6481	-89.0	.2831	-89.0	.0000	-16.0	.2013	91.0
.3000	2.5510	.6735	-88.9	.2853	-89.0	.0000	-23.8	.1894	91.0
.3500	1.8742	.6910	-88.8	.2855	-88.9	.0001	-31.8	.1768	91.0
.4000	1.4349	.6969	-88.6	.2831	-88.9	.0001	-40.1	.1634	90.9
.4500	1.1338	.6872	-88.3	.2778	-88.8	.0001	-49.0	.1494	90.9
.5000	.9184	.6578	-87.8	.2692	-88.6	.0001	-58.5	.1348	91.0
.5500	.7590	.6057	-87.1	.2570	-88.5	.0002	-69.2	.1197	91.1
.6000	.6378	.5294	-85.9	.2411	-88.3	.0002	-81.6	.1046	91.4
.6500	.5434	.4305	-83.9	.2212	-87.9	.0003	-96.0	.0901	91.9
.7000	.4686	.3141	-80.4	.1978	-87.6	.0004	-114.8	.0767	91.7
.7500	.4082	.1902	-73.2	.1712	-87.0	.0005	-138.5	.0627	90.4
.8000	.3587	.0774	-48.7	.1422	-86.4	.0005	-169.1	.0485	89.0
.8500	.3178	.0608	50.4	.1119	-85.4	.0005	154.8	.0354	87.8
.9000	.2834	.1191	81.5	.0814	-84.2	.0004	120.3	.0239	86.4
.9500	.2544	.1437	93.8	.0523	-82.1	.0003	94.3	.0143	84.3
1.0000	.2296	.1253	106.5	.0262	-77.8	.0002	76.6	.0067	80.3
1.0500	.2082	.0752	132.1	.0051	-47.2	.0002	64.7	.0013	54.9
1.1000	.1897	.0528	-146.0	.0127	84.7	.0001	56.4	.0026	-84.0
1.1500	.1736	.1062	-95.9	.0229	92.7	.0001	51.7	.0044	-91.8
1.2000	.1594	.1445	-73.0	.0270	96.3	.0001	48.6	.0049	-95.3
1.2500	.1469	.1370	-45.9	.0255	99.2	.0000	45.9	.0043	-98.3
1.3000	.1359	.1166	12.3	.0196	102.4	.0000	45.4	.0030	-101.6
1.3500	.1260	.1065	16.0	.0110	106.9	.0000	46.5	.0016	-106.3
1.4000	.1171	.0962	21.0	.0018	132.3	.0000	48.5	.0003	-130.9
1.4500	.1092	.0861	27.7	.0066	-78.3	.0000	53.3	.0008	80.1
1.5000	.1020	.0768	36.7	.0120	-71.2	.0000	61.8	.0013	72.3
1.5500	.0956	.0696	48.6	.0138	-65.9	.0000	75.3	.0014	66.6
1.6000	.0897	.0658	63.5	.0122	-59.6	.0000	96.1	.0011	59.9
1.6500	.0843	.0671	80.0	.0079	-49.5	.0000	122.1	.0006	49.2
1.7000	.0794	.0740	95.5	.0028	-14.6	.0000	145.2	.0002	13.1
1.7500	.0750	.0311	143.3	.0037	95.6	.0000	160.7	.0003	-93.7
1.8000	.0709	.0171	-136.0	.0068	118.3	.0000	171.9	.0004	-117.6

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE SURGE DISPLACEMENT (FEET / FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	W A V E A N G L E							
		120.00 DEG.		135.00 DEG.		150.00 DEG.		165.00 DEG.	
		AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE
.2000	5.7398	.3643	91.0	.4661	91.0	.5293	91.0	.5633	91.0
.2500	3.6735	.3340	91.0	.4152	91.0	.4608	90.9	.4832	90.9
.3000	2.5510	.3028	90.9	.3634	90.9	.3915	90.8	.4024	90.7
.3500	1.8742	.2705	90.9	.3101	90.7	.3208	90.5	.3205	90.3
.4000	1.4349	.2368	90.8	.2554	90.4	.2496	90.0	.2394	89.6
.4500	1.1338	.2020	90.6	.2006	90.0	.1807	89.1	.1631	88.3
.5000	.9184	.1668	90.5	.1481	89.4	.1188	87.5	.0981	85.4
.5500	.7590	.1326	90.5	.1014	88.0	.0680	82.4	.0473	75.7
.6000	.6378	.1012	90.0	.0609	82.9	.0285	67.7	.0143	41.1
.6500	.5434	.0718	87.4	.0281	71.7	.0084	4.3	.0104	-54.8
.7000	.4686	.0446	83.1	.0083	29.3	.0109	-70.4	.0118	-89.4
.7500	.4082	.0227	75.7	.0086	-61.3	.0105	-95.9	.0081	-119.3
.8000	.3587	.0077	51.4	.0102	-86.9	.0067	-125.5	.0048	-166.5
.8500	.3178	.0049	-49.5	.0077	-106.2	.0038	-176.3	.0032	140.4
.9000	.2834	.0081	-80.6	.0042	-139.3	.0028	129.2	.0017	85.8
.9500	.2544	.0079	-92.8	.0026	157.6	.0017	78.5	.0010	-7.1
1.0000	.2296	.0055	-105.3	.0024	106.9	.0010	-4.2	.0012	-75.4
1.0500	.2082	.0026	-130.4	.0017	66.5	.0012	-71.1	.0008	-134.0
1.1000	.1897	.0014	147.9	.0010	-.5	.0008	-122.0	.0007	132.9
1.1500	.1736	.0021	96.9	.0011	-66.5	.0006	146.1	.0006	77.9
1.2000	.1594	.0021	73.9	.0008	-108.3	.0006	90.4	.0004	-30.2
1.2500	.1469	.0014	47.0	.0005	178.0	.0003	3.5	.0004	-80.7
1.3000	.1359	.0007	-10.9	.0006	106.0	.0004	-69.8	.0002	153.5
1.3500	.1260	.0008	-74.6	.0004	60.5	.0002	-145.5	.0002	100.0
1.4000	.1171	.0008	-108.3	.0003	-40.0	.0003	119.6	.0002	-31.7
1.4500	.1092	.0004	-149.3	.0003	-90.5	.0001	33.7	.0001	-92.7
1.5000	.1020	.0003	128.7	.0002	-178.2	.0002	-49.7	.0002	150.2
1.5500	.0956	.0004	80.9	.0002	111.7	.0001	-158.8	.0001	37.4
1.6000	.0897	.0003	40.8	.0001	41.0	.0001	133.5	.0001	-36.9
1.6500	.0843	.0002	-41.2	.0002	-45.9	.0001	12.5	.0001	-164.5
1.7000	.0794	.0002	-96.6	.0001	-118.3	.0001	-61.2	.0001	87.8
1.7500	.0750	.0001	-144.7	.0001	151.7	.0001	-171.7	.0001	-11.8
1.8000	.0709	.0001	134.9	.0001	72.4	.0001	80.6	.0002	-137.3

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE SURGE DISPLACEMENT (FEET / FEET)

WAVE	WAVE/SHIP	180.00 DEG.	
FREQ.	LENGTH	AMPL.	PHASE
.2000	5.7398	.5740	91.0
.2500	3.6735	.4898	90.9
.3000	2.5510	.4050	90.7
.3500	1.8742	.3194	90.3
.4000	1.4349	.2350	89.4
.4500	1.1338	.1566	87.9
.5000	.9184	.0909	84.5
.5500	.7590	.0408	72.5
.6000	.6378	.0114	24.4
.6500	.5434	.0114	-64.7
.7000	.4686	.0114	-95.6
.7500	.4082	.0073	-129.6
.8000	.3587	.0044	179.6
.8500	.3178	.0028	128.4
.9000	.2834	.0013	63.6
.9500	.2544	.0011	-34.6
1.0000	.2296	.0011	-93.2
1.0500	.2082	.0007	-167.9
1.1000	.1897	.0007	111.1
1.1500	.1736	.0004	44.1
1.2000	.1594	.0005	-55.1
1.2500	.1469	.0002	-110.7
1.3000	.1359	.0003	127.0
1.3500	.1260	.0001	29.9
1.4000	.1171	.0002	-51.6
1.4500	.1092	.0002	177.7
1.5000	.1020	.0001	118.9
1.5500	.0956	.0002	-8.7
1.6000	.0897	.0001	-121.3
1.6500	.0843	.0001	150.4
1.7000	.0794	.0001	26.6
1.7500	.0750	.0001	-109.6
1.8000	.0709	.0001	145.0

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

SHORT TERM SURGE DISPLACEMENT (FEET)

WAVE HT. (FEET)	ROOT MEAN SQUARE	BROADNESS EPS	PER HOUR
2.380	2.0704E-01	.69049	451.9
4.879	4.8117E-01	.65936	448.0
7.334	8.7877E-01	.60779	439.1
10.497	1.2582E+00	.60770	439.1
13.867	1.8529E+00	.57773	431.7
17.894	2.2978E+00	.58877	434.6
23.554	3.3771E+00	.55792	425.5
28.835	4.4452E+00	.53711	417.4
37.139	6.4174E+00	.50326	399.3
47.602	8.3765E+00	.49768	395.4

LONG TERM RESULTS FOR INDIVIDUAL WAVE HEIGHT GROUPS

WAVE HT. (FEET)	WIDE BAND CORR.	HIGHEST OCCURANCE IN			
		8.0 HRS	24.0 HRS	48.0 HRS	72.0 HRS
2.380	.8727	1.4882E+00	1.6113E+00	1.6864E+00	1.7272E+00
4.879	.8847	3.5148E+00	3.8053E+00	3.9825E+00	4.0788E+00
7.334	.9029	6.5452E+00	7.0856E+00	7.4150E+00	7.5942E+00
10.497	.9030	9.3713E+00	1.0145E+01	1.0617E+01	1.0873E+01
13.867	.9128	1.3903E+01	1.5051E+01	1.5750E+01	1.6131E+01
17.894	.9092	1.7201E+01	1.8621E+01	1.9486E+01	1.9957E+01
23.554	.9189	2.5415E+01	2.7515E+01	2.8795E+01	2.9491E+01
28.835	.9251	3.3493E+01	3.6264E+01	3.7953E+01	3.8872E+01
37.139	.9345	4.8137E+01	5.2138E+01	5.4579E+01	5.5902E+01
47.602	.9360	6.2712E+01	6.7931E+01	7.1115E+01	7.2839E+01

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

LONG TERM SURGE DISPLACEMENT (FEET)

RESPONSE VALUE	PROBABILITY OF EXCEEDENCE	-LOG OF PROBABILITY	NUMBER IN LIFE	HISTOGRAM
0.	1.0000E+00	0.00	1.0000E+08	0.
6.4517E+00	1.4970E-02	1.82	1.4970E+06	9.8503E+07
1.2903E+01	1.8717E-03	2.73	1.8717E+05	1.3098E+06
1.9355E+01	3.0128E-04	3.52	3.0128E+04	1.5705E+05
2.5807E+01	4.3624E-05	4.36	4.3624E+03	2.5765E+04
3.2258E+01	6.3506E-06	5.20	6.3506E+02	3.7274E+03
3.8710E+01	1.1855E-06	5.93	1.1855E+02	5.1651E+02
4.5162E+01	3.0723E-07	6.51	3.0723E+01	8.7832E+01
5.1613E+01	8.9281E-08	7.05	8.9281E+00	2.1795E+01
5.8065E+01	2.5279E-08	7.60	2.5279E+00	6.4002E+00
6.4517E+01	6.6721E-09	8.18	6.6721E-01	1.8607E+00
7.0968E+01	1.6079E-09	8.79	1.6079E-01	5.0642E-01
7.7420E+01	3.4895E-10	9.46	3.4895E-02	1.2589E-01
8.3872E+01	6.7634E-11	10.17	6.7634E-03	2.8132E-02
9.0323E+01	1.1655E-11	10.93	1.1655E-03	5.5978E-03
9.6775E+01	1.7819E-12	11.75	1.7819E-04	9.8734E-04
1.0323E+02	2.4138E-13	12.62	2.4138E-05	1.5405E-04
1.0968E+02	2.8957E-14	13.54	2.8957E-06	2.1243E-05
1.1613E+02	3.0754E-15	14.51	3.0754E-07	2.5882E-06
1.2258E+02	2.8911E-16	15.54	2.8911E-08	2.7863E-07
1.2903E+02	2.4060E-17	16.62	2.4060E-09	2.6505E-08
1.3548E+02	1.7726E-18	17.75	1.7726E-10	2.2287E-09
1.4194E+02	1.1564E-19	18.94	1.1564E-11	1.6570E-10
1.4839E+02	6.6814E-21	20.18	6.6814E-13	1.0896E-11
1.5484E+02	3.4190E-22	21.47	3.4190E-14	6.3395E-13
1.6129E+02	1.5497E-23	22.81	1.5497E-15	3.2641E-14
1.6774E+02	6.2211E-25	24.21	6.2211E-17	1.4875E-15
1.7419E+02	2.2117E-26	25.66	2.2117E-18	6.0000E-17
1.8065E+02	6.9624E-28	27.16	6.9624E-20	2.1421E-18
1.8710E+02	1.9401E-29	28.71	1.9401E-21	6.7684E-20
1.9355E+02	4.7846E-31	30.32	4.7846E-23	1.8923E-21

INTERPOLATED VALUES

MAXIMUM VALUE IN 10** 4 CYCLES = 2.3037E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 5 CYCLES = 3.0738E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 6 CYCLES = 3.9523E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 7 CYCLES = 5.1021E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 8 CYCLES = 6.2557E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 9 CYCLES = 7.2974E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10**10 CYCLES = 8.2334E+01 (AMPLITUDE)

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE SWAY DISPLACEMENT (FEET / FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	15.00 DEG.		30.00 DEG.		45.00 DEG.		60.00 DEG.	
		AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE
.2000	5.7398	.3572	88.7	.6612	89.0	.8765	89.3	.9916	89.8
.2500	3.6735	.3632	89.4	.6694	89.6	.8816	89.9	.9889	90.5
.3000	2.5510	.3516	90.9	.6496	91.0	.8566	91.5	.9909	93.2
.3500	1.8742	.3153	94.6	.5905	94.3	.8187	96.5	.9961	92.8
.4000	1.4349	.2516	103.6	.4914	102.1	.8042	100.6	.9465	93.5
.4500	1.1338	.1767	127.8	.3707	119.0	.7199	104.2	.8718	95.1
.5000	.9184	.1702	179.5	.2874	154.3	.5882	112.1	.7697	97.8
.5500	.7590	.1632	179.6	.3409	-163.3	.4466	128.0	.6427	102.0
.6000	.6378	.1537	179.7	.4795	-139.3	.3526	156.5	.4976	108.8
.6500	.5434	.1415	179.9	.5680	-124.1	.3578	-169.9	.3487	121.2
.7000	.4686	.1266	-179.8	.5350	-123.8	.4175	-144.0	.2241	146.0
.7500	.4082	.1091	-179.4	.4950	-123.3	.3988	-116.8	.1740	-169.7
.8000	.3587	.0889	-178.7	.4480	-122.7	.2628	-76.5	.2018	-131.3
.8500	.3178	.0662	-177.3	.3941	-121.8	.3124	4.1	.2312	-108.8
.9000	.2834	.0408	-174.0	.3334	-120.5	.2916	3.3	.2232	-91.0
.9500	.2544	.0137	-156.1	.2660	-118.3	.2678	2.1	.1761	-69.3
1.0000	.2296	.0209	-105.5	.1924	-114.1	.2410	.6	.1195	-29.6
1.0500	.2082	.0087	-87.1	.1147	-103.4	.2114	-1.5	.1213	31.5
1.1000	.1897	.0045	50.0	.0400	-87.1	.1793	-4.8	.1684	71.3
1.1500	.1736	.0048	73.9	.0104	25.1	.1450	-9.9	.1872	99.5
1.2000	.1594	.0015	170.9	.0145	72.0	.1101	-18.9	.1677	136.0
1.2500	.1469	.0034	-120.6	.0053	117.8	.0783	-37.3	.2280	-158.5
1.3000	.1359	.0016	-15.1	.0064	-134.4	.0443	61.9	.3983	-111.8
1.3500	.1260	.0028	64.1	.0055	-82.2	.0313	97.9	.3693	-111.8
1.4000	.1171	.0021	-170.8	.0058	31.2	.0120	169.9	.3377	-111.9
1.4500	.1092	.0019	-91.9	.0046	102.9	.0114	-116.0	.3036	-112.0
1.5000	.1020	.0017	24.0	.0054	-148.2	.0090	-64.6	.2668	-112.1
1.5500	.0956	.0010	124.3	.0037	-56.0	.0077	15.9	.2275	-112.3
1.6000	.0897	.0010	-136.4	.0036	41.4	.0096	87.1	.1856	-112.6
1.6500	.0843	.0007	-25.2	.0024	146.6	.0082	175.3	.1412	-113.1
1.7000	.0794	.0005	75.2	.0020	-121.0	.0086	-105.2	.0942	-114.1
1.7500	.0750	.0004	-167.3	.0015	-12.7	.0067	-10.3	.0516	-39.2
1.8000	.0709	.0003	-46.2	.0010	84.6	.0052	75.9	.0332	-15.8

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE SWAY DISPLACEMENT (FEET / FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	75.00 DEG.		90.00 DEG.		105.00 DEG.		120.00 DEG.	
		AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE
.2000	5.7398	1.0142	90.3	.9617	90.8	.8555	91.3	.7159	91.9
.2500	3.6735	1.0070	91.5	.9667	91.3	.8407	90.5	.6813	90.4
.3000	2.5510	1.0227	91.2	.9384	90.6	.8005	90.4	.6355	90.2
.3500	1.8742	.9980	91.2	.9110	90.7	.7620	90.3	.5856	89.6
.4000	1.4349	.9670	91.7	.8817	90.9	.7196	89.9	.5276	88.4
.4500	1.1338	.9259	92.5	.8493	91.1	.6712	89.4	.4597	86.4
.5000	.9184	.8750	93.5	.8129	91.4	.6165	88.5	.3818	83.6
.5500	.7590	.8118	94.9	.7730	91.6	.5547	87.3	.2968	79.8
.6000	.6378	.7370	96.6	.7289	91.9	.4870	85.8	.2106	75.0
.6500	.5434	.6511	98.8	.6825	92.1	.4156	84.2	.1310	67.9
.7000	.4686	.5559	101.6	.6327	92.2	.3421	82.4	.0662	53.9
.7500	.4082	.4544	105.3	.5826	92.2	.2694	80.4	.0269	10.3
.8000	.3587	.3502	110.5	.5313	92.2	.2009	78.2	.0277	-59.1
.8500	.3178	.2481	118.3	.4798	92.2	.1393	75.4	.0347	-82.5
.9000	.2834	.1568	132.5	.4284	92.2	.0867	71.4	.0331	-93.5
.9500	.2544	.0911	164.0	.3779	92.2	.0448	63.8	.0249	-102.9
1.0000	.2296	.0787	-143.1	.3283	92.1	.0151	36.4	.0148	-115.7
1.0500	.2082	.1010	-110.2	.2809	91.9	.0136	-65.1	.0062	-144.6
1.1000	.1897	.1201	-92.9	.2360	91.7	.0244	-89.3	.0036	132.4
1.1500	.1736	.1222	-80.4	.1942	91.5	.0292	-97.3	.0051	85.9
1.2000	.1594	.1076	-68.2	.1560	91.2	.0284	-102.6	.0049	61.1
1.2500	.1469	.0814	-52.2	.1216	90.8	.0237	-107.9	.0034	34.6
1.3000	.1359	.0531	-24.3	.0915	90.3	.0170	-114.2	.0019	-12.8
1.3500	.1260	.0401	27.3	.0657	89.5	.0097	-124.1	.0016	-76.5
1.4000	.1171	.0504	73.2	.0445	88.5	.0036	-153.3	.0016	-120.4
1.4500	.1092	.0619	99.3	.0274	86.7	.0030	101.4	.0011	-161.8
1.5000	.1020	.0643	119.3	.0143	82.9	.0056	72.1	.0007	138.3
1.5500	.0956	.0571	140.7	.0050	69.1	.0065	59.2	.0009	69.2
1.6000	.0897	.0450	169.3	.0024	-46.4	.0058	48.0	.0005	-16.4
1.6500	.0843	.0360	-150.5	.0057	-75.3	.0041	33.8	.0004	-41.0
1.7000	.0794	.0348	-106.1	.0074	-80.6	.0023	8.4	.0004	-104.7
1.7500	.0750	.0364	-68.1	.0075	-82.9	.0013	-54.9	.0003	-168.4
1.8000	.0709	.0359	-33.5	.0067	-84.3	.0017	-111.7	.0003	142.3

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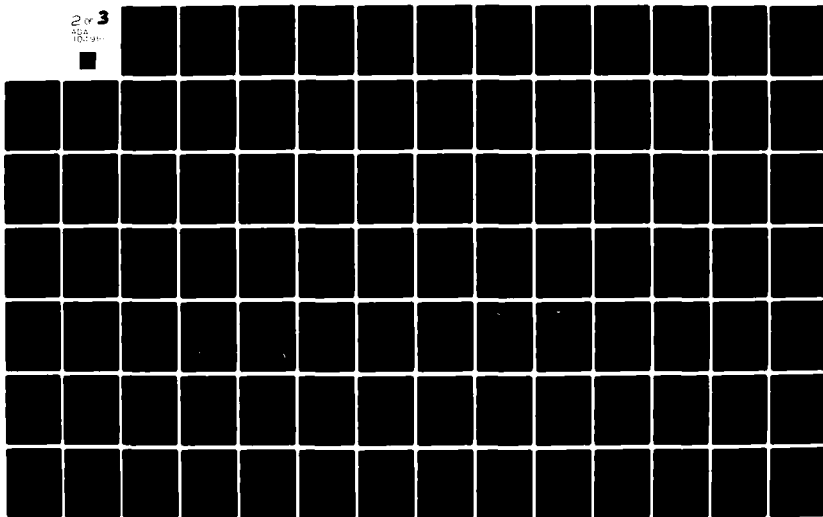
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SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE SWAY DISPLACEMENT (FEET / FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	135.00 DEG.		150.00 DEG.		165.00 DEG.	
		AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE
.2000	5.7398	.5556	91.9	.3768	91.4	.1891	91.0
.2500	3.6735	.5103	90.3	.3373	90.2	.1675	90.2
.3000	2.5510	.4643	89.8	.2996	89.4	.1461	89.1
.3500	1.8742	.4110	88.5	.2553	87.4	.1210	86.5
.4000	1.4349	.3482	86.1	.2028	83.6	.0915	81.5
.4500	1.1338	.2751	82.1	.1439	77.1	.0596	72.7
.5000	.9184	.1957	76.1	.0851	66.1	.0304	55.3
.5500	.7590	.1185	66.6	.0384	40.8	.0129	5.8
.6000	.6378	.0560	46.4	.0210	-25.7	.0124	-56.6
.6500	.5434	.0265	-12.5	.0240	-69.5	.0116	-81.3
.7000	.4686	.0309	-65.5	.0202	-87.2	.0070	-98.3
.7500	.4082	.0309	-84.6	.0114	-104.2	.0025	-135.4
.8000	.3587	.0224	-97.5	.0042	-145.5	.0017	138.7
.8500	.3178	.0117	-115.7	.0031	134.0	.0015	99.6
.9000	.2834	.0046	-165.0	.0028	95.4	.0007	49.6
.9500	.2544	.0041	121.3	.0015	49.0	.0006	-42.6
1.0000	.2296	.0038	85.1	.0012	-35.3	.0006	-88.9
1.0500	.2082	.0024	44.1	.0012	-85.2	.0003	-148.1
1.1000	.1897	.0016	-21.0	.0007	-136.2	.0003	126.3
1.1500	.1736	.0016	-78.6	.0005	139.5	.0002	70.9
1.2000	.1594	.0011	-121.7	.0005	82.3	.0001	-22.9
1.2500	.1469	.0007	170.7	.0003	1.8	.0001	-92.1
1.3000	.1359	.0006	100.7	.0002	-72.4	.0076	138.8
1.3500	.1260	.0005	41.7	.0001	176.1	.0001	98.8
1.4000	.1171	.0004	-37.0	.0002	99.4	.0001	-51.9
1.4500	.1092	.0003	-99.2	.0002	10.8	.0001	-134.1
1.5000	.1020	.0002	156.7	.0002	-83.4	.0001	133.9
1.5500	.0956	.0003	102.5	.0002	-168.5	.0001	44.3
1.6000	.0897	.0002	11.9	.0001	99.7	.0001	-51.4
1.6500	.0843	.0002	-69.8	.0001	27.0	.0001	-110.4
1.7000	.0794	.0002	-148.2	.0001	-88.4	.0001	102.8
1.7500	.0750	.0001	129.7	.0000	-103.0	.0002	-146.0
1.8000	.0709	.0001	48.4	.0002	102.7	.0009	173.9

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

SHORT TERM SWAY DISPLACEMENT (FEET)

WAVE HT. (FEET)	ROOT MEAN SQUARE	BROADNESS EPS	PER HOUR
2.380	1.5987E-01	.58381	653.2
4.879	3.5923E-01	.57464	632.9
7.334	6.2631E-01	.55991	596.9
10.497	8.9666E-01	.55988	596.9
13.867	1.2941E+00	.55194	573.2
17.894	1.6157E+00	.55478	582.3
23.554	2.3358E+00	.54721	555.7
28.835	3.0563E+00	.54296	535.3
37.139	4.4271E+00	.53863	494.8
47.602	5.7945E+00	.53841	486.8

LONG TERM RESULTS FOR INDIVIDUAL WAVE HEIGHT GROUPS

WAVE HT. (FEET)	WIDE BAND CORR.	8.0 HRS	24.0 HRS	48.0 HRS	72.0 HRS
2.380	.9108	7.3387E-01	7.8583E-01	8.1735E-01	8.3527E-01
4.879	.9137	1.6531E+00	1.7707E+00	1.8419E+00	1.8826E+00
7.334	.9183	2.8850E+00	3.0920E+00	3.2168E+00	3.2888E+00
10.497	.9183	4.1303E+00	4.4267E+00	4.6054E+00	4.7085E+00
13.867	.9207	5.9471E+00	6.3761E+00	6.6341E+00	6.7839E+00
17.894	.9198	7.4337E+00	7.9689E+00	8.2910E+00	8.4776E+00
23.554	.9221	1.0701E+01	1.1476E+01	1.1941E+01	1.2212E+01
28.835	.9234	1.3931E+01	1.4944E+01	1.5550E+01	1.5905E+01
37.139	.9246	1.9914E+01	2.1375E+01	2.2246E+01	2.2755E+01
47.602	.9247	2.5989E+01	2.7898E+01	2.9035E+01	2.9700E+01

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

LONG TERM SWAY DISPLACEMENT (FEET)

RESPONSE VALUE	PROBABILITY OF EXCEEDENCE	-LOG OF PROBABILITY	NUMBER IN LIFE	HISTOGRAM
0.	1.0000E+00	0.00	1.0000E+08	0.
2.4892E+00	3.5568E-02	1.45	3.5568E+06	9.6443E+07
4.9785E+00	4.3714E-03	2.36	4.3714E+05	3.1196E+06
7.4677E+00	6.8651E-04	3.16	6.8651E+04	3.6849E+05
9.9570E+00	9.7511E-05	4.01	9.7511E+03	5.8900E+04
1.2446E+01	1.3997E-05	4.85	1.3997E+03	8.3514E+03
1.4935E+01	2.5898E-06	5.59	2.5898E+02	1.1407E+03
1.7425E+01	6.6573E-07	6.18	6.6573E+01	1.9240E+02
1.9914E+01	1.9252E-07	6.72	1.9252E+01	4.7321E+01
2.2403E+01	5.4384E-08	7.26	5.4384E+00	1.3813E+01
2.4892E+01	1.4340E-08	7.84	1.4340E+00	4.0044E+00
2.7382E+01	3.4545E-09	8.46	3.4545E-01	1.0885E+00
2.9871E+01	7.4971E-10	9.13	7.4971E-02	2.7048E-01
3.2360E+01	1.4535E-10	9.84	1.4535E-02	6.0437E-02
3.4849E+01	2.5059E-11	10.60	2.5059E-03	1.2029E-02
3.7339E+01	3.8335E-12	11.42	3.8335E-04	2.1225E-03
3.9828E+01	5.1978E-13	12.28	5.1978E-05	3.3137E-04
4.2317E+01	6.2422E-14	13.20	6.2422E-06	4.5736E-05
4.4806E+01	6.6370E-15	14.18	6.6370E-07	5.5785E-06
4.7296E+01	6.2460E-16	15.20	6.2460E-08	6.0124E-07
4.9785E+01	5.2019E-17	16.28	5.2019E-09	5.7259E-08
5.2274E+01	3.8337E-18	17.42	3.8337E-10	4.8185E-09
5.4763E+01	2.5002E-19	18.60	2.5002E-11	3.5837E-10
5.7253E+01	1.4430E-20	19.84	1.4430E-12	2.3559E-11
5.9742E+01	7.3703E-22	21.13	7.3703E-14	1.3693E-12
6.2231E+01	3.3318E-23	22.48	3.3318E-15	7.0371E-14
6.4720E+01	1.3331E-24	23.88	1.3331E-16	3.1985E-15
6.7210E+01	4.7208E-26	25.33	4.7208E-18	1.2859E-16
6.9699E+01	1.4795E-27	26.83	1.4795E-19	4.5729E-18
7.2188E+01	4.1034E-29	28.39	4.1034E-21	1.4385E-19
7.4677E+01	1.0069E-30	30.00	1.0069E-22	4.0027E-21
INTERPOLATED VALUES				
MAXIMUM VALUE IN 10** 4 CYCLES = 9.9248E+00 (AMPLITUDE)				
MAXIMUM VALUE IN 10** 5 CYCLES = 1.2942E+01 (AMPLITUDE)				
MAXIMUM VALUE IN 10** 6 CYCLES = 1.6679E+01 (AMPLITUDE)				
MAXIMUM VALUE IN 10** 7 CYCLES = 2.1204E+01 (AMPLITUDE)				
MAXIMUM VALUE IN 10** 8 CYCLES = 2.5523E+01 (AMPLITUDE)				
MAXIMUM VALUE IN 10** 9 CYCLES = 2.9402E+01 (AMPLITUDE)				
MAXIMUM VALUE IN 10**10 CYCLES = 3.2890E+01 (AMPLITUDE)				

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE YAW DISPLACEMENT (DEGREE/ FEET)

		W A V E A N G L E							
WAVE	WAVE/SHIP	15.00 DEG.		30.00 DEG.		45.00 DEG.		60.00 DEG.	
FREQ.	LENGTH	AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE
.2000	5.7398	.0131	-9.1	.0224	-9.7	.0255	-10.9	.0218	-13.9
.2500	3.6735	.0271	-13.0	.0457	-13.3	.0508	-14.6	.0418	-19.6
.3000	2.5510	.0468	-16.3	.0782	-16.9	.0849	-20.5	.0528	-30.5
.3500	1.8742	.0714	-19.5	.1187	-21.2	.1123	-29.8	.0719	-12.6
.4000	1.4349	.0984	-22.5	.1621	-25.6	.1245	-26.0	.1061	-11.0
.4500	1.1338	.1224	-24.9	.2018	-28.8	.1556	-20.1	.1392	-11.6
.5000	.9184	.1360	-26.5	.2295	-30.0	.1843	-18.6	.1696	-12.2
.5500	.7590	.1304	-26.5	.2311	-29.5	.1963	-18.2	.1940	-12.8
.6000	.6378	.1226	-26.4	.1946	-27.4	.1824	-17.8	.2083	-13.0
.6500	.5434	.1127	-26.4	.1177	-18.9	.1372	-17.2	.2087	-12.8
.7000	.4686	.1007	-26.3	.1084	-18.9	.0720	-20.9	.1927	-12.0
.7500	.4082	.0865	-26.1	.0971	-19.0	.0207	28.5	.1598	-10.0
.8000	.3587	.0701	-25.8	.0839	-19.1	.0907	126.7	.1131	-5.7
.8500	.3178	.0516	-25.3	.0686	-19.2	.1680	140.3	.0594	5.8
.9000	.2834	.0310	-24.1	.0514	-19.4	.1563	141.1	.0197	75.8
.9500	.2544	.0083	-15.4	.0322	-19.9	.1430	142.2	.0470	150.5
1.0000	.2296	.0039	115.8	.0111	-22.5	.1279	143.7	.0706	167.3
1.0500	.2082	.0050	163.2	.0122	165.0	.1113	145.8	.0722	-178.4
1.1000	.1897	.0010	178.1	.0163	162.6	.0933	149.1	.0532	-154.4
1.1500	.1736	.0017	-30.2	.0055	-174.4	.0741	154.4	.0368	-90.7
1.2000	.1594	.0014	-33.0	.0035	-38.8	.0545	164.4	.0612	-28.9
1.2500	.1469	.0007	131.4	.0039	-25.0	.0372	-173.7	.0893	-15.4
1.3000	.1359	.0013	141.6	.0006	25.4	.0128	-109.6	.1100	2.7
1.3500	.1260	.0007	-63.6	.0026	138.7	.0110	-24.4	.0990	3.9
1.4000	.1171	.0008	-27.2	.0011	172.7	.0057	10.3	.0871	5.6
1.4500	.1092	.0008	108.8	.0024	-51.0	.0028	89.8	.0744	8.0
1.5000	.1020	.0004	-173.0	.0012	19.7	.0035	156.8	.0609	11.7
1.5500	.0956	.0005	-59.3	.0018	124.1	.0028	-158.1	.0469	18.0
1.6000	.0897	.0003	50.4	.0010	-135.0	.0027	-60.5	.0332	30.4
1.6500	.0843	.0003	146.3	.0011	-44.6	.0028	-10.4	.0224	58.8
1.7000	.0794	.0002	-95.5	.0007	66.3	.0028	89.0	.0227	106.3
1.7500	.0750	.0001	11.3	.0006	158.2	.0023	162.2	.0053	153.8
1.8000	.0709	.0001	126.3	.0005	-90.3	.0019	-98.8	.0085	-128.9

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE YAW DISPLACEMENT (DEGREE/ FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	75.00 DEG.		W A V E A N G L E 90.00 DEG.		105.00 DEG.		120.00 DEG.	
		AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE
.2000	5.7398	.0130	-23.9	.0052	-88.6	.0125	-156.4	.0205	-170.6
.2500	3.6735	.0207	-42.0	.0086	-178.9	.0176	168.4	.0243	174.9
.3000	2.5510	.0231	-7.9	.0004	173.1	.0219	-179.9	.0341	-178.3
.3500	1.8742	.0408	-8.3	.0027	-64.9	.0295	-175.7	.0447	-175.8
.4000	1.4349	.0571	-9.6	.0049	-66.0	.0376	-173.8	.0543	-174.5
.4500	1.1338	.0738	-10.4	.0068	-66.6	.0454	-173.0	.0620	-173.9
.5000	.9184	.0905	-10.9	.0084	-66.5	.0524	-172.7	.0669	-173.9
.5500	.7590	.1065	-11.3	.0100	-65.7	.0585	-173.1	.0684	-174.3
.6000	.6378	.1209	-11.5	.0110	-64.1	.0630	-173.8	.0660	-174.6
.6500	.5434	.1323	-11.6	.0119	-62.0	.0665	-174.7	.0592	-175.1
.7000	.4686	.1398	-11.5	.0123	-59.7	.0680	-175.4	.0482	-175.9
.7500	.4082	.1423	-11.4	.0122	-56.3	.0673	-176.1	.0346	-177.5
.8000	.3587	.1389	-10.9	.0119	-52.7	.0638	-176.8	.0207	179.4
.8500	.3178	.1296	-10.1	.0113	-49.0	.0580	-177.5	.0087	172.3
.9000	.2834	.1144	-8.9	.0107	-45.1	.0502	-178.6	.0015	79.3
.9500	.2544	.0943	-7.2	.0103	-41.4	.0410	-179.9	.0053	10.1
1.0000	.2296	.0708	-4.5	.0096	-37.9	.0313	178.4	.0067	-.1
1.0500	.2082	.0455	.4	.0090	-34.5	.0218	175.9	.0056	-9.9
1.1000	.1897	.0215	12.3	.0084	-31.4	.0133	172.0	.0035	-25.2
1.1500	.1736	.0067	94.8	.0077	-28.5	.0062	164.1	.0015	-61.8
1.2000	.1594	.0185	159.9	.0071	-25.7	.0012	112.3	.0012	-143.8
1.2500	.1469	.0280	172.5	.0064	-22.9	.0031	6.8	.0015	174.8
1.3000	.1359	.0312	-178.9	.0057	-20.0	.0049	-5.8	.0013	148.5
1.3500	.1260	.0284	-169.5	.0050	-17.0	.0053	-13.6	.0008	113.3
1.4000	.1171	.0213	-155.7	.0044	-14.0	.0047	-21.6	.0005	49.5
1.4500	.1092	.0128	-128.3	.0037	-10.9	.0034	-31.7	.0005	-9.4
1.5000	.1020	.0093	-67.9	.0031	-7.9	.0020	-48.9	.0004	-52.4
1.5500	.0956	.0129	-20.5	.0026	-5.0	.0009	-92.2	.0001	-93.2
1.6000	.0897	.0159	3.5	.0022	-2.8	.0010	-165.7	.0003	-144.9
1.6500	.0843	.0155	23.7	.0017	-1.6	.0013	162.8	.0002	131.6
1.7000	.0794	.0123	49.7	.0014	-2.0	.0014	144.6	.0002	72.6
1.7500	.0750	.0093	91.6	.0011	-5.0	.0011	126.5	.0002	13.4
1.8000	.0709	.0093	141.5	.0009	-11.5	.0007	101.0	.0001	-60.2

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE YAW DISPLACEMENT (DEGREE/ FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	135.00 DEG.		W A V E A N G L E 150.00 DEG.		165.00 DEG.	
		AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE
.2000	5.7398	.0226	178.9	.0175	172.1	.0091	170.0
.2500	3.6735	.0255	178.1	.0208	179.8	.0115	-179.4
.3000	2.5510	.0356	-177.1	.0284	-176.2	.0155	-175.7
.3500	1.8742	.0449	-175.0	.0346	-174.3	.0185	-173.9
.4000	1.4349	.0519	-173.9	.0380	-173.4	.0196	-173.1
.4500	1.1338	.0553	-173.6	.0378	-173.2	.0185	-173.0
.5000	.9184	.0542	-173.7	.0337	-173.2	.0151	-172.9
.5500	.7590	.0487	-173.7	.0255	-173.5	.0099	-173.9
.6000	.6378	.0384	-174.3	.0150	-175.3	.0041	-178.2
.6500	.5434	.0249	-175.9	.0050	176.7	.0006	57.4
.7000	.4686	.0115	179.4	.0021	27.7	.0023	12.6
.7500	.4082	.0016	133.5	.0046	9.7	.0022	3.4
.8000	.3587	.0049	14.1	.0038	-.1	.0010	-17.1
.8500	.3178	.0061	3.9	.0018	-23.0	.0004	-101.6
.9000	.2834	.0045	-7.6	.0008	-104.2	.0005	-159.0
.9500	.2544	.0021	-34.2	.0009	-160.7	.0003	157.8
1.0000	.2296	.0011	-111.0	.0007	158.6	.0002	76.8
1.0500	.2082	.0013	-166.7	.0004	88.3	.0002	12.9
1.1000	.1897	.0010	159.2	.0004	19.3	.0001	-41.9
1.1500	.1736	.0006	106.2	.0003	-29.6	.0001	-136.6
1.2000	.1594	.0005	32.2	.0002	-117.5	.0001	166.7
1.2500	.1469	.0004	-15.6	.0002	179.0	.0001	61.8
1.3000	.1359	.0002	-77.1	.0001	87.3	.0008	147.5
1.3500	.1260	.0002	-157.6	.0001	14.5	.0000	-164.8
1.4000	.1171	.0002	136.4	.0000	-97.2	.0000	139.3
1.4500	.1092	.0001	36.7	.0001	176.1	.0000	41.4
1.5000	.1020	.0001	-9.1	.0001	92.7	.0000	-52.3
1.5500	.0956	.0001	-116.6	.0001	8.9	.0000	-139.1
1.6000	.0897	.0001	-174.6	.0001	-75.9	.0000	135.1
1.6500	.0843	.0001	108.9	.0001	-179.3	.0000	5.9
1.7000	.0794	.0001	28.2	.0001	124.1	.0000	27.8
1.7500	.0750	.0001	-53.6	.0001	-4.3	.0001	-151.1
1.8000	.0709	.0000	-138.4	.0000	107.1	.0005	170.7

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

SHORT TERM YAW DISPLACEMENT (DEGREE)

WAVE HT. (FEET)	ROOT MEAN SQUARE	BROADNESS EPS	PER HOUR
2.380	4.1460E-02	.65113	616.0
4.879	9.1159E-02	.64261	600.6
7.334	1.5022E-01	.62977	574.0
10.497	2.1504E-01	.62975	574.0
13.867	2.9478E-01	.62269	557.6
17.894	3.7586E-01	.62527	563.7
23.554	5.0864E-01	.61816	546.1
28.835	6.2681E-01	.61359	533.1
37.139	7.9018E-01	.60694	508.9
47.602	1.0034E+00	.60602	504.3

LONG TERM RESULTS FOR INDIVIDUAL WAVE HEIGHT GROUPS

WAVE HT. (FEET)	WIDE BAND CORR.	8.0 HRS	24.0 HRS	48.0 HRS	72.0 HRS
2.380	.8877	1.9489E-01	2.0828E-01	2.1649E-01	2.2098E-01
4.879	.8908	4.3413E-01	4.6413E-01	4.8247E-01	4.9259E-01
7.334	.8954	7.3321E-01	7.8542E-01	8.1714E-01	8.3496E-01
10.497	.8954	1.0496E+00	1.1244E+00	1.1698E+00	1.1953E+00
13.867	.8978	1.4615E+00	1.5676E+00	1.6310E+00	1.6682E+00
17.894	.8970	1.8527E+00	1.9862E+00	2.0665E+00	2.1130E+00
23.554	.8994	2.5478E+00	2.7351E+00	2.8462E+00	2.9113E+00
28.835	.9010	3.1726E+00	3.4087E+00	3.5478E+00	3.6292E+00
37.139	.9032	4.0598E+00	4.3679E+00	4.5476E+00	4.6527E+00
47.602	.9035	5.1659E+00	5.5592E+00	5.7883E+00	5.9223E+00

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

LONG TERM YAW DISPLACEMENT (DEGREE)

RESPONSE VALUE	PROBABILITY OF EXCEEDENCE	-LOG OF PROBABILITY	NUMBER IN LIFE	HISTOGRAM
0.	1.0000E+00	0.00	1.0000E+08	0.
5.0516E-01	5.0416E-02	1.30	5.0416E+06	9.4958E+07
1.0103E+00	6.7805E-03	2.17	6.7805E+05	4.3636E+06
1.5155E+00	1.2883E-03	2.89	1.2883E+05	5.4922E+05
2.0206E+00	2.3058E-04	3.64	2.3058E+04	1.0577E+05
2.5258E+00	3.5645E-05	4.45	3.5645E+03	1.9494E+04
3.0310E+00	5.1557E-06	5.29	5.1557E+02	3.0490E+03
3.5361E+00	8.2391E-07	6.08	8.2391E+01	4.3317E+02
4.0413E+00	1.7021E-07	6.77	1.7021E+01	6.5370E+01
4.5464E+00	4.2128E-08	7.38	4.2128E+00	1.2808E+01
5.0516E+00	1.0585E-08	7.98	1.0585E+00	3.1544E+00
5.5567E+00	2.4854E-09	8.60	2.4854E-01	8.0993E-01
6.0619E+00	5.2972E-10	9.28	5.2972E-02	1.9557E-01
6.5671E+00	1.0125E-10	9.99	1.0125E-02	4.2848E-02
7.0722E+00	1.7250E-11	10.76	1.7250E-03	8.3999E-03
7.5774E+00	2.6113E-12	11.58	2.6113E-04	1.4638E-03
8.0825E+00	3.5070E-13	12.46	3.5070E-05	2.2606E-04
8.5877E+00	4.1747E-14	13.38	4.1747E-06	3.0895E-05
9.0929E+00	4.4024E-15	14.36	4.4024E-07	3.7344E-06
9.5980E+00	4.1113E-16	15.39	4.1113E-08	3.9913E-07
1.0103E+01	3.3990E-17	16.47	3.3990E-09	3.7714E-08
1.0608E+01	2.4871E-18	17.60	2.4871E-10	3.1503E-09
1.1113E+01	1.6104E-19	18.79	1.6104E-11	2.3261E-10
1.1619E+01	9.2253E-21	20.04	9.2253E-13	1.5181E-11
1.2124E+01	4.6750E-22	21.33	4.6750E-14	8.7578E-13
1.2629E+01	2.0955E-23	22.68	2.0955E-15	4.4655E-14
1.3134E+01	8.3073E-25	24.08	8.3073E-17	2.0124E-15
1.3639E+01	2.9126E-26	25.54	2.9126E-18	8.0160E-17
1.4144E+01	9.0307E-28	27.04	9.0307E-20	2.8223E-18
1.4650E+01	2.4762E-29	28.61	2.4762E-21	8.7831E-20
1.5155E+01	6.0043E-31	30.22	6.0043E-23	2.4161E-21

INTERPOLATED VALUES

MAXIMUM VALUE IN 10** 4 CYCLES = 2.2467E+00 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 5 CYCLES = 2.8579E+00 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 6 CYCLES = 3.4828E+00 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 7 CYCLES = 4.2337E+00 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 8 CYCLES = 5.0714E+00 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 9 CYCLES = 5.8543E+00 (AMPLITUDE)
 MAXIMUM VALUE IN 10**10 CYCLES = 6.5706E+00 (AMPLITUDE)

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE ROLL DISPLACEMENT (DEGREE/ FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	15.00 DEG.		30.00 DEG.		45.00 DEG.		60.00 DEG.	
		AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE
.2000	5.7398	.0450	-58.3	.0852	-61.7	.1172	-68.2	.1417	-78.5
.2500	3.6735	.1041	-60.3	.2044	-64.2	.3026	-72.4	.4178	-89.5
.3000	2.5510	.2131	-65.3	.4533	-71.0	.7985	-88.0	1.1685	-144.6
.3500	1.8742	.3751	-71.7	.9005	-81.8	1.8212	-126.4	.9504	163.3
.4000	1.4349	.5467	-77.5	1.5012	-93.5	2.3032	-169.1	.7924	149.6
.4500	1.1338	.6453	-81.6	2.0259	-100.8	2.3562	169.0	.7664	143.2
.5000	.9184	.6168	-85.1	2.1613	-102.0	2.5146	157.5	.7871	138.2
.5500	.7590	.5942	-85.2	1.8196	-100.6	2.7877	150.5	.8234	133.1
.6000	.6378	.5630	-85.4	1.1923	-101.8	3.1370	147.2	.8569	127.7
.6500	.5434	.5231	-85.7	.5721	-112.1	3.4876	149.7	.8719	121.9
.7000	.4686	.4746	-86.1	.5469	-110.6	3.3482	165.1	.8527	115.5
.7500	.4082	.4174	-86.7	.5169	-108.6	1.5236	179.9	.7848	108.2
.8000	.3587	.3518	-87.6	.4825	-105.9	.8734	122.1	.6572	99.1
.8500	.3178	.2776	-89.2	.4445	-102.4	1.0503	102.8	.4716	84.7
.9000	.2834	.1953	-92.4	.4041	-97.6	.9762	103.0	.2803	48.8
.9500	.2544	.1062	-101.6	.3631	-91.0	.8912	103.2	.3261	-18.9
1.0000	.2296	.1470	42.1	.3249	-81.9	.7951	103.5	.6012	-46.7
1.0500	.2082	.0056	91.9	.2948	-69.7	.6880	103.9	.8844	-55.4
1.1000	.1897	.0158	-111.5	.0804	62.7	.5700	104.5	1.0819	-56.7
1.1500	.1736	.0080	-128.3	.0537	-112.0	.4411	105.6	1.1063	-50.9
1.2000	.1594	.0044	89.5	.0322	-118.8	.3015	107.7	.6739	-26.4
1.2500	.1469	.0049	60.4	.0064	119.7	.1524	114.6	.6954	-122.7
1.3000	.1359	.0023	-109.0	.0144	65.0	.4194	-134.5	.7374	-94.6
1.3500	.1260	.0027	-122.6	.0028	16.8	.0557	-129.2	.6871	-93.9
1.4000	.1171	.0013	52.0	.0080	-122.3	.0341	78.3	.6324	-93.1
1.4500	.1092	.0008	48.4	.0014	-126.0	.0295	57.4	.5734	-92.1
1.5000	.1020	.0007	-139.5	.0039	49.4	.0025	-44.0	.5102	-90.7
1.5500	.0956	.0002	43.5	.0004	145.6	.0147	-125.5	.4430	-88.8
1.6000	.0897	.0003	41.1	.0016	-137.4	.0038	-130.3	.3721	-85.9
1.6500	.0843	.0004	-159.7	.0009	17.3	.0072	41.2	.2984	-81.5
1.7000	.0794	.0002	-44.1	.0006	54.6	.0034	74.7	.2237	-73.6
1.7500	.0750	.0002	23.8	.0008	-172.1	.0040	-153.1	.1434	-3.4
1.8000	.0709	.0003	143.9	.0005	-60.5	.0018	-99.0	.0434	-99.4

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE ROLL DISPLACEMENT (DEGREE/ FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	75.00 DEG.		90.00 DEG.		105.00 DEG.		120.00 DEG.	
		AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE
.2000	5.7398	.1644	-94.3	.1984	-115.5	.2579	-140.8	.3368	-170.2
.2500	3.6735	.5913	-129.7	.5524	154.7	.3281	102.5	.2250	77.6
.3000	2.5510	.5319	148.4	.2407	107.3	.1688	75.2	.1427	58.8
.3500	1.8742	.3427	134.3	.1579	98.1	.1286	63.4	.1231	50.7
.4000	1.4349	.2874	132.3	.1211	93.9	.1131	55.1	.1177	47.0
.4500	1.1338	.2690	132.6	.0983	91.2	.1066	49.1	.1178	46.3
.5000	.9184	.2657	133.0	.0817	89.2	.1046	45.2	.1166	47.4
.5500	.7590	.2693	132.8	.0683	87.7	.1036	42.9	.1149	50.1
.6000	.6378	.2754	131.8	.0581	86.7	.1039	41.8	.1087	52.9
.6500	.5434	.2819	129.8	.0487	86.1	.1020	42.7	.0980	57.7
.7000	.4686	.2868	127.0	.0404	85.7	.0983	43.2	.0839	63.6
.7500	.4082	.2874	123.5	.0335	86.5	.0931	45.5	.0673	70.7
.8000	.3587	.2846	119.3	.0265	87.1	.0867	48.1	.0496	79.6
.8500	.3178	.2766	114.6	.0191	89.0	.0790	51.5	.0320	92.0
.9000	.2834	.2620	109.3	.0126	90.1	.0697	55.6	.0176	113.7
.9500	.2544	.2405	103.7	.0062	93.5	.0597	60.1	.0096	163.2
1.0000	.2296	.2125	97.5	.0009	148.2	.0492	65.4	.0107	-143.3
1.0500	.2082	.1809	90.8	.0049	-102.1	.0391	71.5	.0126	-121.7
1.1000	.1897	.1419	82.5	.0095	-97.4	.0295	78.9	.0117	-112.7
1.1500	.1736	.1007	71.0	.0133	-95.6	.0209	88.0	.0085	-109.9
1.2000	.1594	.0624	50.5	.0162	-94.7	.0137	100.3	.0043	-114.8
1.2500	.1469	.0401	5.2	.0183	-94.3	.0082	119.4	.0009	-165.7
1.3000	.1359	.0484	-44.2	.0195	-93.9	.0047	154.1	.0019	94.1
1.3500	.1260	.0656	-66.8	.0198	-93.5	.0039	-157.6	.0024	79.7
1.4000	.1171	.0747	-77.8	.0196	-93.3	.0044	-125.7	.0016	67.2
1.4500	.1092	.0714	-85.0	.0186	-93.1	.0045	-109.1	.0005	19.6
1.5000	.1020	.0566	-91.9	.0172	-92.9	.0040	-98.1	.0008	-86.9
1.5500	.0956	.0340	-103.9	.0154	-92.8	.0030	-88.8	.0008	-104.2
1.6000	.0897	.0139	-154.8	.0134	-92.7	.0018	-76.8	.0004	-141.4
1.6500	.0843	.0243	130.7	.0113	-92.5	.0007	-42.2	.0003	100.4
1.7000	.0794	.0385	117.6	.0092	-92.4	.0007	40.1	.0005	79.4
1.7500	.0750	.0420	115.5	.0073	-92.3	.0011	63.2	.0002	55.9
1.8000	.0709	.0332	117.3	.0056	-92.0	.0011	68.6	.0002	-81.5

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE ROLL DISPLACEMENT (DEGREE/ FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	135.00 DEG.		WAVE ANGLE 150.00 DEG.		165.00 DEG.	
		AMPL.	PHASE	AMPL.	PHASE	AMPL.	PHASE
.2000	5.7398	.3622	156.6	.2721	128.8	.1351	113.4
.2500	3.6735	.1615	65.6	.1066	59.9	.0533	57.4
.3000	2.5510	.1155	52.4	.0813	50.6	.0419	50.2
.3500	1.8742	.1050	48.5	.0754	49.2	.0391	50.4
.4000	1.4349	.1031	48.5	.0742	51.6	.0377	53.7
.4500	1.1338	.1011	50.9	.0708	55.7	.0356	59.1
.5000	.9184	.0985	54.8	.0640	62.4	.0301	65.5
.5500	.7590	.0880	59.5	.0519	68.1	.0226	75.6
.6000	.6378	.0735	66.5	.0371	79.8	.0143	91.7
.6500	.5434	.0555	75.8	.0223	97.7	.0072	123.8
.7000	.4686	.0367	88.8	.0112	136.4	.0050	-172.3
.7500	.4082	.0200	112.2	.0093	-160.5	.0059	-133.5
.8000	.3587	.0111	164.9	.0110	-129.1	.0055	-120.2
.8500	.3178	.0124	-142.6	.0098	-118.5	.0035	-121.8
.9000	.2834	.0138	-122.2	.0062	-121.3	.0015	-149.0
.9500	.2544	.0116	-115.8	.0027	-149.3	.0010	137.0
1.0000	.2296	.0071	-119.7	.0018	135.0	.0009	91.1
1.0500	.2082	.0028	-150.0	.0017	92.1	.0005	38.1
1.1000	.1897	.0020	126.8	.0009	49.1	.0004	-50.7
1.1500	.1736	.0024	90.6	.0007	-43.4	.0004	-85.6
1.2000	.1594	.0015	62.2	.0008	-81.8	.0001	164.4
1.2500	.1469	.0007	-23.9	.0002	-147.0	.0002	113.2
1.3000	.1359	.0011	-79.3	.0004	117.4	.0029	-41.1
1.3500	.1260	.0006	-106.1	.0002	100.1	.0002	-44.3
1.4000	.1171	.0004	133.3	.0003	-49.3	.0000	160.8
1.4500	.1092	.0005	110.3	.0001	-61.1	.0000	156.0
1.5000	.1020	.0001	32.8	.0001	134.4	.0000	-28.1
1.5500	.0956	.0003	-63.2	.0000	-83.5	.0000	131.2
1.6000	.0897	.0001	-61.9	.0001	-29.5	.0000	-145.0
1.6500	.0843	.0002	113.8	.0001	165.6	.0000	-.9
1.7000	.0794	.0000	71.1	.0000	-2.8	.0000	-130.1
1.7500	.0750	.0001	-44.0	.0002	3.6	.0000	33.7
1.8000	.0709	.0000	-147.3	.0001	-116.6	.0003	3.0

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

SHORT TERM ROLL DISPLACEMENT (DEGREE)

WAVE HT. (FEET)	ROOT MEAN SQUARE	BROADNESS EPS	PER HOUR
2.380	3.3608E-01	.56804	490.5
4.879	7.4557E-01	.54677	482.3
7.334	1.2370E+00	.51731	467.0
10.497	1.7708E+00	.51726	467.0
13.867	2.4370E+00	.50252	456.3
17.894	3.1021E+00	.50779	460.5
23.554	4.2224E+00	.49353	448.2
28.835	5.2379E+00	.48474	438.2
37.139	6.7259E+00	.47242	416.3
47.602	8.5779E+00	.47076	411.6

LONG TERM RESULTS FOR INDIVIDUAL WAVE HEIGHT GROUPS

WAVE HT. (FEET)	WIDE BAND CORR.	HIGHEST OCCURANCE IN			
		8.0 HRS	24.0 HRS	48.0 HRS	72.0 HRS
2.380	.9158	2.0543E+00	2.2057E+00	2.2963E+00	2.3490E+00
4.879	.9222	4.6172E+00	4.9593E+00	5.1630E+00	5.2822E+00
7.334	.9307	7.7955E+00	8.3789E+00	8.7238E+00	8.9256E+00
10.497	.9307	1.1159E+01	1.1994E+01	1.2488E+01	1.2777E+01
13.867	.9347	1.5485E+01	1.6651E+01	1.7338E+01	1.7740E+01
17.894	.9333	1.9654E+01	2.1131E+01	2.2002E+01	2.2512E+01
23.554	.9371	2.6948E+01	2.8987E+01	3.0184E+01	3.0884E+01
28.835	.9394	3.3538E+01	3.6088E+01	3.7581E+01	3.8454E+01
37.139	.9426	4.3046E+01	4.6345E+01	4.8269E+01	4.9394E+01
47.602	.9430	5.4825E+01	5.9032E+01	6.1485E+01	6.2919E+01

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

LONG TERM ROLL DISPLACEMENT (DEGREE)

RESPONSE VALUE	PROBABILITY OF EXCEEDENCE	-LOG OF PROBABILITY	NUMBER IN LIFE	HISTOGRAM
0.	1.0000E+00	0.00	1.0000E+08	0.
5.3472E+00	4.6279E-02	1.33	4.6279E+06	9.5372E+07
1.0694E+01	6.6024E-03	2.18	6.6024E+05	3.9677E+06
1.6041E+01	1.3209E-03	2.88	1.3209E+05	5.2815E+05
2.1389E+01	2.4930E-04	3.60	2.4930E+04	1.0716E+05
2.6736E+01	4.0361E-05	4.39	4.0361E+03	2.0894E+04
3.2087E+01	6.0499E-06	5.22	6.0499E+02	3.4312E+03
3.7430E+01	9.9004E-07	6.00	9.9004E+01	5.0598E+02
4.2777E+01	2.0791E-07	6.68	2.0791E+01	7.8213E+01
4.8124E+01	5.2403E-08	7.28	5.2403E+00	1.5551E+01
5.3472E+01	1.3430E-08	7.87	1.3430E+00	3.8973E+00
5.8819E+01	3.2131E-09	8.49	3.2131E-01	1.0217E+00
6.4166E+01	6.9616E-10	9.16	6.9616E-02	2.5169E-01
6.9513E+01	1.3493E-10	9.87	1.3493E-02	5.6123E-02
7.4860E+01	2.3257E-11	10.63	2.3257E-03	1.1167E-02
8.0207E+01	3.5549E-12	11.45	3.5549E-04	1.9702E-03
8.5554E+01	4.8126E-13	12.32	4.8126E-05	3.0737E-04
9.0902E+01	5.7668E-14	13.24	5.7668E-06	4.2359E-05
9.6249E+01	6.1146E-15	14.21	6.1146E-07	5.1553E-06
1.0160E+02	5.7359E-16	15.24	5.7359E-08	5.5410E-07
1.0694E+02	4.7596E-17	16.32	4.7596E-09	5.2599E-08
1.1229E+02	3.4932E-18	17.46	3.4932E-10	4.4102E-09
1.1764E+02	2.2673E-19	18.64	2.2673E-11	3.2664E-10
1.2298E+02	1.3013E-20	19.89	1.3013E-12	2.1371E-11
1.2833E+02	6.6031E-22	21.18	6.6031E-14	1.2352E-12
1.3368E+02	2.9621E-23	22.53	2.9621E-15	6.3069E-14
1.3903E+02	1.1746E-24	23.93	1.1746E-16	2.8447E-15
1.4437E+02	4.1166E-26	25.39	4.1166E-18	1.1334E-16
1.4972E+02	1.2751E-27	26.89	1.2751E-19	3.9891E-18
1.5507E+02	3.4899E-29	28.46	3.4899E-21	1.2402E-19
1.6041E+02	8.4402E-31	30.07	8.4402E-23	3.4055E-21

INTERPOLATED VALUES

MAXIMUM VALUE IN 10** 4 CYCLES = 2.4071E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 5 CYCLES = 3.0667E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 6 CYCLES = 3.7401E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 7 CYCLES = 4.5617E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 8 CYCLES = 5.4574E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 9 CYCLES = 6.2900E+01 (AMPLITUDE)
 MAXIMUM VALUE IN 10**10 CYCLES = 7.0424E+01 (AMPLITUDE)

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE VERTICAL BENDING MOMENT AT STATION 10 (FEET -L.TONS/ FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	0.00 DEGREES		W A V E A N G L E 15.00 DEGREES		30.00 DEGREES	
		AMPLITUDE	PHASE	AMPLITUDE	PHASE	AMPLITUDE	PHASE
.2000	5.7398	1.6286E+03	35.0	1.4909E+03	35.4	1.1084E+03	37.4
.2500	3.6735	4.3331E+03	31.7	4.0202E+03	31.7	3.1377E+03	32.0
.3000	2.5510	8.9005E+03	31.4	8.3342E+03	31.3	6.7175E+03	31.1
.3500	1.8742	1.5277E+04	32.7	1.4451E+04	32.4	1.1996E+04	31.8
.4000	1.4349	2.2668E+04	35.1	2.1706E+04	34.8	1.8620E+04	33.7
.4500	1.1338	2.9464E+04	38.9	2.8622E+04	38.2	2.5641E+04	36.6
.5000	.9184	3.3641E+04	44.4	3.3328E+04	43.3	3.1563E+04	40.6
.5500	.7530	3.2003E+04	44.3	3.1727E+04	43.2	3.4746E+04	45.1
.6000	.6378	2.9795E+04	44.1	2.9511E+04	43.2	3.3957E+04	53.4
.6500	.5434	2.7019E+04	43.7	2.6682E+04	43.1	2.9818E+04	63.4
.7000	.4686	2.3675E+04	43.3	2.3238E+04	42.9	2.7643E+04	63.3
.7500	.4082	1.9765E+04	42.5	1.9181E+04	42.7	2.5005E+04	63.0
.8000	.3587	1.5294E+04	41.1	1.4510E+04	42.2	2.1905E+04	62.7
.8500	.3178	1.0275E+04	38.1	9.2281E+03	41.2	1.8342E+04	62.1
.9000	.2834	4.7997E+03	27.3	3.3481E+03	36.1	1.4320E+04	61.2
.9500	.2544	2.3524E+03	-88.7	3.2332E+03	-127.6	9.8443E+03	59.3
1.0000	.2296	1.6169E+03	15.4	1.6100E+03	-20.7	4.9444E+03	53.1
1.0500	.2082	1.7918E+03	123.6	1.5045E+03	87.6	1.2114E+03	-53.7
1.1000	.1897	2.2253E+03	-173.6	2.2348E+03	162.7	1.3030E+03	68.1
1.1500	.1736	1.5209E+03	-101.2	1.7430E+03	-138.3	2.0823E+03	141.6
1.2000	.1594	1.3388E+03	-30.8	1.3581E+03	-57.4	1.8356E+03	-168.4
1.2500	.1469	3.7459E+02	36.1	8.1259E+02	2.0	1.1259E+03	-92.5
1.3000	.1359	5.2706E+02	175.5	3.3471E+02	137.6	9.2288E+02	-20.9
1.3500	.1260	6.1577E+02	-137.3	5.9250E+02	-164.0	4.2754E+02	58.9
1.4000	.1171	5.3045E+02	-80.0	4.9148E+02	-109.3	4.3565E+02	164.1
1.4500	.1092	4.8606E+02	14.1	4.6564E+02	-42.6	4.4363E+02	-155.8
1.5000	.1020	5.0441E+02	94.9	4.7959E+02	51.5	2.9629E+02	-95.1
1.5500	.0956	3.4204E+02	178.1	5.0380E+02	128.2	4.2283E+02	-24.4
1.6000	.0897	7.5162E+02	-47.4	3.5565E+02	-114.0	3.8523E+02	59.9
1.6500	.0843	8.6618E+02	15.4	8.5295E+02	-27.0	5.1164E+02	139.1
1.7000	.0794	5.0015E+02	125.6	7.1994E+02	55.8	4.3650E+02	-119.7
1.7500	.0750	1.2066E+03	-85.1	6.1779E+02	-175.2	7.0734E+02	-34.9
1.8000	.0709	1.5611E+03	-14.5	1.4272E+03	-62.8	7.2242E+02	66.2

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE VERTICAL BENDING MOMENT AT STATION 10 (FEET -L.TONS/ FEET)

		W A V E A N G L E					
		45.00 DEGREES		60.00 DEGREES		75.00 DEGREES	
WAVE	WAVE/SHIP	AMPLITUDE	PHASE	AMPLITUDE	PHASE	AMPLITUDE	PHASE
FREQ.	LENGTH						
.2000	5.7398	5.7362E+02	45.6	1.7605E+02	127.8	5.2343E+02	-172.8
.2500	3.6735	1.8649E+03	33.7	5.1434E+02	48.4	6.6413E+02	-170.4
.3000	2.5510	4.2945E+03	31.0	1.5834E+03	33.5	7.0087E+02	-167.9
.3500	1.8742	8.0773E+03	30.8	3.4457E+03	30.1	5.7023E+02	-165.6
.4000	1.4349	1.3204E+04	32.0	6.2208E+03	29.7	2.0701E+02	-163.2
.4500	1.1338	1.9309E+04	34.0	9.9203E+03	30.6	4.4442E+02	19.2
.5000	.9184	2.5616E+04	36.9	1.4383E+04	32.3	1.4212E+03	21.7
.5500	.7590	3.1006E+04	40.7	1.9272E+04	34.7	2.7356E+03	24.3
.6000	.6378	3.4277E+04	45.7	2.4055E+04	37.6	4.3657E+03	27.0
.6500	.5434	3.4518E+04	51.8	2.8067E+04	41.3	6.2504E+03	29.9
.7000	.4686	3.1516E+04	59.3	3.0618E+04	45.6	8.2918E+03	33.1
.7500	.4082	2.5937E+04	68.1	3.1141E+04	50.6	1.0353E+04	36.4
.8000	.3587	1.9122E+04	77.4	2.9342E+04	56.4	1.2274E+04	40.1
.8500	.3178	1.2654E+04	84.1	2.5323E+04	62.9	1.3880E+04	44.0
.9000	.2834	1.1741E+04	84.2	1.9609E+04	69.8	1.5000E+04	48.3
.9500	.2544	1.0692E+04	84.3	1.3098E+04	76.4	1.5484E+04	53.0
1.0000	.2296	9.5078E+03	84.5	6.9255E+03	79.6	1.5225E+04	58.0
1.0500	.2082	8.1878E+03	84.8	2.4897E+03	59.4	1.4175E+04	63.5
1.1000	.1897	6.7323E+03	85.3	2.2327E+03	-5.1	1.2383E+04	69.5
1.1500	.1736	5.1418E+03	86.1	2.7957E+03	-3.3	9.9323E+03	76.2
1.2000	.1594	3.4179E+03	87.8	2.2824E+03	29.6	7.0480E+03	83.9
1.2500	.1469	1.5695E+03	93.8	2.0068E+03	92.0	4.0211E+03	94.0
1.3000	.1359	1.9334E+03	143.2	2.5498E+03	146.6	1.1953E+03	119.9
1.3500	.1260	1.2738E+03	-167.2	2.2008E+03	147.4	1.4481E+03	-98.7
1.4000	.1171	7.6648E+02	-86.0	1.8216E+03	148.6	3.0579E+03	-77.8
1.4500	.1092	6.3862E+02	-16.2	1.4129E+03	150.7	3.7559E+03	-64.7
1.5000	.1020	3.8982E+02	50.1	9.7722E+02	154.9	3.5601E+03	-49.6
1.5500	.0956	2.5832E+02	131.1	5.2666E+02	165.9	2.6994E+03	-27.7
1.6000	.0897	2.7550E+02	173.6	2.2860E+02	-120.8	1.7053E+03	14.8
1.6500	.0843	2.0245E+02	-164.9	6.1176E+02	-60.3	1.7330E+03	81.6
1.7000	.0794	2.2499E+02	-74.3	1.1592E+03	-49.8	2.4897E+03	123.0
1.7500	.0750	3.7270E+02	-23.9	6.4000E+02	16.6	2.9197E+03	151.3
1.8000	.0709	3.5530E+02	68.9	3.5900E+02	120.4	2.8170E+03	-179.4

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE VERTICAL BENDING MOMENT AT STATION 10 (FEET -L.TONS/ FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	90.00 DEGREES		WAVE ANGLE 105.00 DEGREES		120.00 DEGREES	
		AMPLITUDE	PHASE	AMPLITUDE	PHASE	AMPLITUDE	PHASE
.2000	5.7398	7.3297E+02	-168.4	6.4879E+02	-172.6	3.2965E+02	160.2
.2500	3.6735	1.1711E+03	-165.4	9.2607E+02	-173.6	4.2097E+02	96.9
.3000	2.5510	1.7280E+03	-163.2	1.1602E+03	-178.0	1.3201E+03	56.2
.3500	1.8742	2.4019E+03	-161.7	1.2809E+03	172.1	3.2995E+03	44.5
.4000	1.4349	3.1769E+03	-160.8	1.2799E+03	150.8	6.6148E+03	38.8
.4500	1.1338	4.0235E+03	-160.4	1.4511E+03	111.5	1.1469E+04	34.4
.5000	.9184	4.8996E+03	-160.2	2.4038E+03	74.7	1.7889E+04	29.4
.5500	.7590	5.7508E+03	-160.2	4.4302E+03	49.4	2.5085E+04	22.2
.6000	.6378	6.5134E+03	-160.0	7.3656E+03	32.9	2.9450E+04	10.3
.6500	.5434	7.1158E+03	-159.1	1.0538E+04	12.2	2.6219E+04	7.5
.7000	.4686	7.5230E+03	-157.4	1.0968E+04	-11.1	2.5251E+04	14.8
.7500	.4082	7.8318E+03	-153.1	7.9515E+03	-16.1	2.4530E+04	17.8
.8000	.3587	8.4186E+03	-145.8	6.8572E+03	2.3	2.1014E+04	18.0
.8500	.3178	9.8368E+03	-142.3	7.7749E+03	16.6	1.4632E+04	15.8
.9000	.2834	1.1208E+04	-144.6	8.8052E+03	21.6	6.5220E+03	13.0
.9500	.2544	1.1449E+04	-148.7	9.0537E+03	21.4	1.4479E+03	-166.0
1.0000	.2296	1.0968E+04	-151.1	8.3836E+03	20.4	7.3934E+03	-172.6
1.0500	.2082	1.0153E+04	-152.3	6.8008E+03	18.0	1.0149E+04	-177.1
1.1000	.1897	9.0462E+03	-152.3	4.6804E+03	15.1	9.3643E+03	177.6
1.1500	.1736	7.8555E+03	-151.0	2.3344E+03	10.5	5.9450E+03	171.9
1.2000	.1594	6.5879E+03	-148.9	1.5050E+02	-59.1	1.4806E+03	163.3
1.2500	.1469	5.2668E+03	-145.3	1.7613E+03	-168.0	2.1105E+03	-19.9
1.3000	.1359	4.0916E+03	-139.6	2.9114E+03	-174.5	3.5160E+03	-30.8
1.3500	.1260	3.0574E+03	-130.5	3.2319E+03	179.6	2.6833E+03	-47.1
1.4000	.1171	2.2212E+03	-116.2	2.8364E+03	171.3	9.8501E+02	-102.9
1.4500	.1092	1.7137E+03	-95.6	1.9109E+03	159.3	1.5356E+03	158.9
1.5000	.1020	1.5019E+03	-73.0	8.9470E+02	124.4	1.8049E+03	127.6
1.5500	.0956	1.4571E+03	-54.7	8.6783E+02	38.8	1.0544E+03	84.4
1.6000	.0897	1.4230E+03	-42.6	1.4478E+03	6.4	8.2179E+02	-9.8
1.6500	.0843	1.3381E+03	-35.1	1.6334E+03	-9.4	1.0124E+03	-68.2
1.7000	.0794	1.1679E+03	-30.7	1.3393E+03	-24.8	7.9589E+02	-129.7
1.7500	.0750	9.3566E+02	-28.7	7.5231E+02	-52.4	7.5867E+02	151.6
1.8000	.0709	6.6908E+02	-28.8	4.8358E+02	-135.0	7.8228E+02	86.5

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE VERTICAL BENDING MOMENT AT STATION 10 (FEET -L.TONS/ FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	135.00 DEGREES		150.00 DEGREES		165.00 DEGREES	
		AMPLITUDE	PHASE	AMPLITUDE	PHASE	AMPLITUDE	PHASE
.2000	5.7398	4.2701E+02	64.0	9.6233E+02	43.0	1.3850E+03	38.2
.2500	3.6735	1.6652E+03	42.2	3.1283E+03	35.3	4.2144E+03	33.1
.3000	2.5510	4.3191E+03	36.4	7.3872E+03	32.3	9.6091E+03	30.8
.3500	1.8742	8.9059E+03	33.4	1.4333E+04	30.2	1.8126E+04	28.7
.4000	1.4349	1.5736E+04	30.7	2.3983E+04	27.6	2.9413E+04	26.1
.4500	1.1338	2.4655E+04	27.4	3.5264E+04	24.0	4.1526E+04	22.1
.5000	.9184	3.4443E+04	22.5	4.4825E+04	17.2	4.8690E+04	14.4
.5500	.7590	4.0175E+04	12.7	4.2821E+04	11.0	4.2640E+04	12.8
.6000	.6378	3.5965E+04	11.3	3.7506E+04	15.4	3.5565E+04	16.1
.6500	.5434	3.3139E+04	16.2	2.9554E+04	16.1	2.3072E+04	15.0
.7000	.4686	2.7536E+04	16.9	1.6262E+04	14.0	6.7734E+03	11.2
.7500	.4082	1.7227E+04	14.9	1.6098E+03	10.7	6.6466E+03	-173.1
.8000	.3587	4.9434E+03	11.8	9.0390E+03	-174.3	1.1968E+04	-179.6
.8500	.3178	5.6859E+03	-171.5	1.2030E+04	179.4	8.6665E+03	171.2
.9000	.2834	1.1375E+04	-176.6	7.8893E+03	171.0	1.2731E+03	135.6
.9500	.2544	1.1009E+04	177.6	8.1269E+02	137.7	4.3735E+03	-18.8
1.0000	.2296	6.0203E+03	170.6	4.2424E+03	-22.2	4.4003E+03	-40.9
1.0500	.2082	1.8612E+02	-2.5	4.3563E+03	-41.9	1.7746E+03	-103.1
1.1000	.1897	4.0386E+03	-26.8	1.8727E+03	-95.5	1.8186E+03	165.4
1.1500	.1736	4.0460E+03	-43.2	1.8477E+03	171.4	8.9996E+02	79.3
1.2000	.1594	1.8358E+03	-87.3	1.0595E+03	110.7	1.5766E+03	-10.5
1.2500	.1469	1.7249E+03	175.7	1.2753E+03	-2.3	7.6639E+02	-50.3
1.3000	.1359	1.5436E+03	131.0	1.0752E+03	-45.0	5.3726E+02	146.0
1.3500	.1260	7.8780E+02	38.2	3.6475E+02	-166.5	5.2664E+02	80.3
1.4000	.1171	1.1358E+03	-36.2	5.9331E+02	103.6	9.9009E+02	-69.2
1.4500	.1092	6.6847E+02	-93.6	3.3900E+02	2.4	8.1896E+01	-73.5
1.5000	.1020	5.3473E+02	148.6	2.5148E+02	-104.2	2.4578E+02	16.3
1.5500	.0956	5.9794E+02	77.7	1.5009E+02	83.3	2.9315E+02	-88.7
1.6000	.0897	2.6021E+02	-22.8	2.7894E+02	7.7	1.3164E+02	97.4
1.6500	.0843	4.7791E+02	-122.7	4.0404E+02	-114.9	7.7866E+02	24.3
1.7000	.0794	3.2158E+02	138.9	2.0916E+02	114.7	4.9673E+02	-65.4
1.7500	.0750	4.9932E+02	43.6	4.8951E+02	-47.8	5.3462E+02	97.4
1.8000	.0709	3.9821E+02	-65.4	4.8689E+02	-91.7	8.7218E+02	32.4

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE VERTICAL BENDING MOMENT AT STATION 10 (FEET -L.TONS/ FEET)

WAVE	WAVE/SHIP	180.00 DEGREES	
FREQ.	LENGTH	AMPLITUDE	PHASE
.2000	5.7398	1.5421E+03	37.1
.2500	3.6735	4.6130E+03	32.5
.3000	2.5510	1.0415E+04	30.3
.3500	1.8742	1.9473E+04	28.3
.4000	1.4349	3.1310E+04	25.7
.4500	1.1338	4.3507E+04	21.5
.5000	.9184	4.9387E+04	13.6
.5500	.7590	4.2405E+04	13.4
.6000	.6378	3.4305E+04	16.0
.6500	.5434	2.0294E+04	14.4
.7000	.4686	3.5973E+03	9.5
.7500	.4082	8.6547E+03	-174.6
.8000	.3587	1.1785E+04	178.2
.8500	.3178	6.7185E+03	166.8
.9000	.2834	1.2292E+03	19.4
.9500	.2544	5.0016E+03	-24.0
1.0000	.2296	3.5357E+03	-51.5
1.0500	.2082	1.6107E+03	-144.3
1.1000	.1897	1.5552E+03	144.9
1.1500	.1736	1.1408E+03	27.3
1.2000	.1594	1.5227E+03	-23.1
1.2500	.1469	2.4818E+02	-106.9
1.3000	.1359	6.8009E+02	119.1
1.3500	.1260	4.0608E+02	43.9
1.4000	.1171	1.6290E+02	-36.6
1.4500	.1092	1.3757E+02	16.8
1.5000	.1020	2.2941E+02	-32.7
1.5500	.0956	2.2988E+02	-107.4
1.6000	.0897	5.7077E+02	25.1
1.6500	.0843	2.0163E+03	-69.9
1.7000	.0794	1.2611E+02	111.3
1.7500	.0750	1.1169E+03	54.9
1.8000	.0709	4.2645E+02	-24.3

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

SHORT TERM VERTICAL BENDING MOMENT AT STATION 10 (FEET -L.TONS)

WAVE HT. (FEET)	ROOT MEAN SQUARE	BROADNESS EPS	PER HOUR
2.380	1.0796E+04	.67782	785.7
4.879	2.4155E+04	.66291	760.2
7.334	4.0494E+04	.64047	722.7
10.497	5.7966E+04	.64043	722.6
13.867	7.9721E+04	.62887	702.0
17.894	1.0159E+05	.63300	709.6
23.554	1.3741E+05	.62190	688.5
28.835	1.6854E+05	.61525	674.0
37.139	2.0843E+05	.60628	649.0
47.602	2.6330E+05	.60508	644.6

LONG TERM RESULTS FOR INDIVIDUAL WAVE HEIGHT GROUPS

WAVE HT. (FEET)	WIDE BAND CORR.	HIGHEST OCCURANCE IN			
		8.0 HRS	24.0 HRS	48.0 HRS	72.0 HRS
2.380	.8777	4.0813E+04	4.3501E+04	4.5169E+04	4.6080E+04
4.879	.8833	9.5249E+04	1.0187E+05	1.0588E+05	1.0821E+05
7.334	.8916	1.7126E+05	1.8380E+05	1.9126E+05	1.9562E+05
10.497	.8916	2.4518E+05	2.6314E+05	2.7382E+05	2.8006E+05
13.867	.8957	3.4941E+05	3.7545E+05	3.9083E+05	3.9982E+05
17.894	.8942	4.3970E+05	4.7228E+05	4.9157E+05	5.0285E+05
23.554	.8981	6.1491E+05	6.6117E+05	6.8835E+05	7.0426E+05
28.835	.9004	7.6900E+05	8.2732E+05	8.6147E+05	8.8144E+05
37.139	.9034	9.7601E+05	1.0508E+06	1.0945E+06	1.1200E+06
47.602	.9038	1.2373E+06	1.3322E+06	1.3877E+06	1.4201E+06

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

LONG TERM VERTICAL BENDING MOMENT AT STATION 10 (FEET -L.TONS)

RESPONSE VALUE	PROBABILITY OF EXCEEDENCE	-LOG OF PROBABILITY	NUMBER IN LIFE	HISTOGRAM
0.	1.0000E+00	0.00	1.0000E+08	0.
1.2135E+05	5.5747E-02	1.25	5.5747E+06	9.4425E+07
2.4270E+05	6.8449E-03	2.16	6.8449E+05	4.8902E+06
3.6404E+05	1.1575E-03	2.94	1.1575E+05	5.6875E+05
4.8539E+05	1.9487E-04	3.71	1.9487E+04	9.6262E+04
6.0674E+05	3.0055E-05	4.52	3.0055E+03	1.6482E+04
7.2809E+05	4.4252E-06	5.35	4.4252E+02	2.5629E+03
8.4944E+05	6.9825E-07	6.16	6.9825E+01	3.7270E+02
9.7079E+05	1.3648E-07	6.86	1.3648E+01	5.6178E+01
1.0921E+06	3.2345E-08	7.49	3.2345E+00	1.0413E+01
1.2135E+06	8.0071E-09	8.10	8.0071E-01	2.4338E+00
1.3348E+06	1.8799E-09	8.73	1.8799E-01	6.1272E-01
1.4562E+06	4.0291E-10	9.39	4.0291E-02	1.4770E-01
1.5775E+06	7.7611E-11	10.11	7.7611E-03	3.2530E-02
1.6989E+06	1.3334E-11	10.88	1.3334E-03	6.4277E-03
1.8202E+06	2.0355E-12	11.69	2.0355E-04	1.1299E-03
1.9416E+06	2.7554E-13	12.56	2.7554E-05	1.7600E-04
2.0629E+06	3.3041E-14	13.48	3.3041E-06	2.4250E-05
2.1843E+06	3.5077E-15	14.45	3.5077E-07	2.9533E-06
2.3056E+06	3.2958E-16	15.48	3.2958E-08	3.1782E-07
2.4270E+06	2.7399E-17	16.56	2.7399E-09	3.0218E-08
2.5483E+06	2.0151E-18	17.70	2.0151E-10	2.5384E-09
2.6697E+06	1.3111E-19	18.88	1.3111E-11	1.8840E-10
2.7910E+06	7.5470E-21	20.12	7.5470E-13	1.2357E-11
2.9124E+06	3.8434E-22	21.42	3.8434E-14	7.1627E-13
3.0337E+06	1.7319E-23	22.76	1.7319E-15	3.6703E-14
3.1551E+06	6.9057E-25	24.16	6.9057E-17	1.6628E-15
3.2764E+06	2.4368E-26	25.61	2.4368E-18	6.6620E-17
3.3977E+06	7.6096E-28	27.12	7.6096E-20	2.3607E-18
3.5191E+06	2.1030E-29	28.68	2.1030E-21	7.3993E-20
3.6404E+06	5.1431E-31	30.29	5.1431E-23	2.0516E-21

INTERPOLATED VALUES

MAXIMUM VALUE IN 10** 4 CYCLES = 5.2870E+05 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 5 CYCLES = 6.7645E+05 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 6 CYCLES = 8.2583E+05 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 7 CYCLES = 9.8700E+05 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 8 CYCLES = 1.1342E+06 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 9 CYCLES = 1.3846E+06 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 10 CYCLES = 1.5589E+06 (AMPLITUDE)

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE LATERAL BENDING MOMENT AT STATION 10 (FEET -L.TONS/ FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	15.00 DEGREES		30.00 DEGREES		45.00 DEGREES	
		AMPLITUDE	PHASE	AMPLITUDE	PHASE	AMPLITUDE	PHASE
.2000	5.7398	3.5708E+02	94.4	6.4982E+02	94.0	8.3466E+02	93.2
.2500	3.6735	6.3559E+02	95.0	1.1492E+03	94.6	1.4627E+03	93.5
.3000	2.5510	1.0853E+03	93.7	1.9671E+03	93.2	2.5325E+03	90.6
.3500	1.8742	1.7670E+03	90.7	3.2547E+03	89.8	4.1014E+03	80.6
.4000	1.4349	2.6878E+03	87.0	5.0668E+03	85.3	5.4700E+03	74.2
.4500	1.1338	3.7465E+03	82.9	7.2611E+03	81.2	7.5203E+03	74.1
.5000	.9184	4.7234E+03	78.8	9.4552E+03	78.0	1.0364E+04	73.1
.5500	.7590	4.5576E+03	78.4	1.1103E+04	75.1	1.3520E+04	71.1
.6000	.6378	4.3286E+03	77.8	1.1674E+04	72.0	1.6321E+04	68.7
.6500	.5434	4.0368E+03	77.0	1.0773E+04	68.9	1.8034E+04	66.0
.7000	.4686	3.6830E+03	75.8	1.0103E+04	68.7	1.8212E+04	64.1
.7500	.4082	3.2687E+03	74.0	9.2910E+03	68.5	1.5798E+04	65.4
.8000	.3587	2.7966E+03	71.4	8.3361E+03	68.2	1.1018E+04	65.6
.8500	.3178	2.2728E+03	67.1	7.2389E+03	67.8	6.0640E+03	63.6
.9000	.2834	1.7129E+03	59.2	5.9999E+03	67.1	5.4879E+03	63.1
.9500	.2544	1.1697E+03	42.2	4.6200E+03	65.9	4.8266E+03	62.4
1.0000	.2296	6.6934E+02	40.6	3.1022E+03	63.4	4.0808E+03	61.4
1.0500	.2082	3.2559E+02	-2.7	1.4643E+03	54.7	3.2517E+03	59.7
1.1000	.1897	3.8694E+02	-55.9	4.3163E+02	.3	2.3430E+03	56.4
1.1500	.1736	2.4059E+02	-26.9	7.2695E+02	-66.0	1.3703E+03	48.0
1.2000	.1594	4.8022E+02	52.8	5.8434E+02	-48.7	5.0746E+02	.4
1.2500	.1469	5.0111E+02	56.3	6.7127E+02	34.8	1.0928E+03	-86.6
1.3000	.1359	3.5207E+02	-94.1	9.8078E+02	60.1	1.0085E+03	-63.4
1.3500	.1260	5.3255E+02	-96.9	1.3895E+02	85.6	6.8077E+02	-10.0
1.4000	.1171	4.7979E+02	43.8	1.1265E+03	-107.0	9.0761E+02	49.0
1.4500	.1092	3.3983E+02	91.0	4.5004E+02	-50.3	7.8163E+02	85.6
1.5000	.1020	5.0795E+02	-130.4	1.1588E+03	57.6	4.2450E+02	159.9
1.5500	.0956	3.4693E+02	-43.7	5.8801E+02	151.0	9.3684E+02	-112.4
1.6000	.0897	4.0111E+02	50.3	9.9978E+02	-119.3	9.4207E+02	-68.3
1.6500	.0843	3.3622E+02	174.8	7.2843E+02	-15.6	1.2548E+03	43.3
1.7000	.0794	3.3309E+02	-94.6	7.4671E+02	68.7	1.3014E+03	100.4
1.7500	.0750	3.0817E+02	17.4	6.8745E+02	-178.7	1.2876E+03	-157.7
1.8000	.0709	2.4798E+02	142.9	5.9346E+02	-89.5	1.1372E+03	-84.6

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE LATERAL BENDING MOMENT AT STATION 10 (FEET -L.TONS/ FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	60.00 DEGREES		75.00 DEGREES		90.00 DEGREES	
		AMPLITUDE	PHASE	AMPLITUDE	PHASE	AMPLITUDE	PHASE
.2000	5.7398	9.0055E+02	91.6	8.6823E+02	88.5	7.7563E+02	83.3
.2500	3.6735	1.5695E+03	90.3	1.4713E+03	80.7	9.6106E+02	70.7
.3000	2.5510	2.4552E+03	78.1	1.6770E+03	80.9	1.3735E+03	83.9
.3500	1.8742	3.0554E+03	80.3	2.4424E+03	84.6	1.9031E+03	84.3
.4000	1.4349	4.5733E+03	82.3	3.4364E+03	84.1	2.4460E+03	84.1
.4500	1.1338	6.7834E+03	81.1	4.7172E+03	82.4	2.9829E+03	84.0
.5000	.9184	9.7652E+03	78.9	6.3769E+03	80.0	3.4726E+03	84.3
.5500	.7590	1.3513E+04	76.5	8.4968E+03	77.2	3.8615E+03	85.0
.6000	.6378	1.7826E+04	74.0	1.1110E+04	74.1	4.0838E+03	86.6
.6500	.5434	2.2240E+04	71.8	1.4251E+04	70.9	4.0827E+03	88.8
.7000	.4686	2.6040E+04	70.0	1.7801E+04	67.7	3.9303E+03	92.2
.7500	.4082	2.8373E+04	68.6	2.1625E+04	64.7	3.4718E+03	97.9
.8000	.3587	2.8474E+04	67.8	2.5414E+04	61.9	2.8473E+03	107.4
.8500	.3178	2.5945E+04	67.6	2.8781E+04	59.5	2.1281E+03	126.1
.9000	.2834	2.0986E+04	68.2	3.1310E+04	57.5	1.7714E+03	160.2
.9500	.2544	1.4445E+04	69.6	3.2553E+04	56.1	2.1502E+03	-162.1
1.0000	.2296	7.6268E+03	71.1	3.2155E+04	55.2	3.0699E+03	-142.0
1.0500	.2082	1.9208E+03	65.2	2.9770E+04	54.8	4.1766E+03	-130.8
1.1000	.1897	1.8886E+03	-79.9	2.5689E+04	55.2	5.3051E+03	-123.9
1.1500	.1736	3.2761E+03	-77.3	2.0120E+04	56.7	6.3845E+03	-119.3
1.2000	.1594	2.9447E+03	-62.7	1.3613E+04	59.9	7.3470E+03	-115.8
1.2500	.1469	2.0286E+03	-11.4	6.9519E+03	67.8	8.1514E+03	-113.1
1.3000	.1359	2.1378E+03	55.5	1.6119E+03	123.9	8.7609E+03	-110.8
1.3500	.1260	1.9491E+03	58.1	4.3603E+03	-137.4	9.1372E+03	-108.9
1.4000	.1171	1.7492E+03	61.5	7.1483E+03	-124.3	9.3252E+03	-107.2
1.4500	.1092	1.5421E+03	66.3	7.9435E+03	-115.7	9.2229E+03	-105.7
1.5000	.1020	1.3349E+03	72.9	6.8850E+03	-105.8	8.8707E+03	-104.4
1.5500	.0956	1.1405E+03	82.6	4.5732E+03	-89.8	8.2865E+03	-103.3
1.6000	.0897	9.8321E+02	96.7	2.2330E+03	-46.8	7.4953E+03	-102.4
1.6500	.0843	9.0207E+02	115.8	2.5378E+03	32.5	6.5549E+03	-101.6
1.7000	.0794	9.3699E+02	137.0	3.8942E+03	64.3	5.5176E+03	-100.9
1.7500	.0750	9.2142E+02	167.5	4.2058E+03	84.1	4.4477E+03	-100.4
1.8000	.0709	4.2305E+02	-179.8	3.4209E+03	107.6	3.4035E+03	-100.0

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE LATERAL BENDING MOMENT AT STATION 10 (FEET -L.TONS/ FEET)

		W A V E A N G L E					
		105.00 DEGREES		120.00 DEGREES		135.00 DEGREES	
WAVE	WAVE/SHIP	AMPLITUDE	PHASE	AMPLITUDE	PHASE	AMPLITUDE	PHASE
FREQ.	LENGTH						
.2000	5.7398	6.5717E+02	74.5	5.1858E+02	61.0	3.4018E+02	45.3
.2500	3.6735	7.2594E+02	79.3	6.5212E+02	81.7	5.8075E+02	82.5
.3000	2.5510	1.2244E+03	83.5	1.2323E+03	84.2	1.2622E+03	86.0
.3500	1.8742	1.8057E+03	84.5	2.1705E+03	86.6	2.5488E+03	88.3
.4000	1.4349	2.5712E+03	86.1	3.7496E+03	88.0	4.8092E+03	88.1
.4500	1.1333	3.6016E+03	87.9	6.1625E+03	87.5	8.1199E+03	85.5
.5000	.9184	4.9292E+03	89.1	9.3946E+03	85.2	1.2112E+04	82.1
.5500	.7590	6.5140E+03	89.2	1.3221E+04	82.2	1.6222E+04	79.0
.6000	.6375	8.3715E+03	88.3	1.7463E+04	79.3	1.9402E+04	77.9
.6500	.5434	1.0379E+04	86.1	2.1495E+04	77.9	2.0623E+04	78.8
.7000	.4686	1.2626E+04	83.7	2.4665E+04	78.1	1.9199E+04	81.1
.7500	.4082	1.5136E+04	82.2	2.6197E+04	79.6	1.5102E+04	84.3
.8000	.3587	1.7704E+04	81.4	2.5514E+04	81.6	9.3500E+03	88.1
.8500	.3178	2.0192E+04	81.7	2.2347E+04	84.1	3.4703E+03	96.4
.9000	.2834	2.2304E+04	82.4	1.7187E+04	86.2	1.2541E+03	-130.0
.9500	.2544	2.3655E+04	83.5	1.0757E+04	88.3	3.1472E+03	-115.5
1.0000	.2296	2.4026E+04	84.7	4.3104E+03	92.1	3.0538E+03	-131.4
1.0500	.2082	2.3306E+04	85.5	1.0644E+03	-123.7	2.3195E+03	-170.9
1.1000	.1897	2.1304E+04	85.9	4.0687E+03	-107.3	2.1855E+03	139.9
1.1500	.1736	1.8135E+04	85.6	4.8133E+03	-114.0	1.9780E+03	101.8
1.2000	.1594	1.4049E+04	84.3	3.7724E+03	-130.1	1.1451E+03	63.1
1.2500	.1469	9.4471E+03	80.8	2.1902E+03	-168.7	6.8244E+02	-40.9
1.3000	.1359	4.8658E+03	71.6	2.0395E+03	121.1	1.1200E+03	-103.3
1.3500	.1260	1.3836E+03	16.1	2.5813E+03	81.0	9.4116E+02	-153.6
1.4000	.1171	3.0043E+03	-74.5	2.2830E+03	50.8	8.4686E+02	136.2
1.4500	.1092	4.9869E+03	-90.2	1.4568E+03	4.2	7.7715E+02	84.1
1.5000	.1020	5.5114E+03	-99.9	1.2946E+03	-67.3	5.6706E+02	-30.1
1.5500	.0956	4.9305E+03	-110.7	2.1686E+03	-118.1	7.9393E+02	-82.9
1.6000	.0897	3.5715E+03	-125.9	1.1102E+03	155.5	6.4399E+02	-171.5
1.6500	.0843	2.0116E+03	-158.0	9.9567E+02	122.4	5.6819E+02	108.0
1.7000	.0794	1.5802E+03	132.8	9.9130E+02	63.2	6.3573E+02	28.6
1.7500	.0750	2.3309E+03	88.5	9.3946E+02	4.7	3.7913E+02	-49.3
1.8000	.0709	2.7448E+03	65.1	7.0268E+02	-44.1	5.9698E+02	-135.6

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE LATERAL BENDING MOMENT AT STATION 10 (FEET -L.TONS/ FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	150.00 DEGREES		WAVE ANGLE 165.00 DEGREES	
		AMPLITUDE	PHASE	AMPLITUDE	PHASE
.2000	5.7398	1.7605E+02	39.1	7.4054E+01	43.3
.2500	3.6735	4.5850E+02	83.4	2.5850E+02	84.2
.3000	2.5510	1.0959E+03	87.4	6.5226E+02	88.3
.3500	1.8742	2.3865E+03	89.0	1.4583E+03	89.2
.4000	1.4349	4.5832E+03	87.5	2.7838E+03	86.9
.4500	1.1338	7.5406E+03	84.0	4.4541E+03	83.0
.5000	.9184	1.0679E+04	80.1	6.0363E+03	79.7
.5500	.7590	1.3122E+04	78.5	6.8930E+03	78.6
.6000	.6378	1.3818E+04	78.9	6.5106E+03	80.2
.6500	.5434	1.2186E+04	81.4	4.8658E+03	83.6
.7000	.4686	8.5050E+03	85.2	2.4934E+03	89.6
.7500	.4082	3.9929E+03	91.5	4.2284E+02	124.4
.8000	.3587	5.4617E+02	159.3	8.7897E+02	-117.2
.8500	.3178	1.8706E+03	-116.7	9.6922E+02	-132.4
.9000	.2834	1.9756E+03	-132.6	8.5607E+02	179.7
.9500	.2544	1.6688E+03	-176.9	9.3782E+02	138.5
1.0000	.2296	1.7512E+03	139.2	6.6189E+02	111.6
1.0500	.2082	1.3458E+03	108.7	1.3275E+02	64.2
1.1000	.1897	4.4962E+02	65.5	3.5185E+02	-99.5
1.1500	.1736	5.8110E+02	-85.1	4.0500E+02	-140.4
1.2000	.1594	8.0380E+02	-126.2	3.5276E+02	150.7
1.2500	.1469	6.3533E+02	168.1	1.7184E+02	97.7
1.3000	.1359	5.1174E+02	109.6	1.0078E+04	131.8
1.3500	.1260	1.8821E+02	-52.7	2.2607E+02	-103.3
1.4000	.1171	6.0245E+02	-85.7	2.4753E+02	148.7
1.4500	.1092	5.2927E+02	-164.5	1.4857E+02	37.3
1.5000	.1020	4.3663E+02	107.4	2.7978E+02	-51.1
1.5500	.0956	4.5736E+02	1.9	3.1662E+02	-141.4
1.6000	.0897	4.3497E+02	-84.5	1.5410E+02	100.9
1.6500	.0843	4.9677E+02	-153.2	2.4424E+02	79.8
1.7000	.0794	4.9689E+02	70.7	6.2713E+02	-95.6
1.7500	.0750	3.2714E+02	124.0	1.6042E+03	33.3
1.8000	.0709	1.2262E+03	-84.2	7.9441E+03	-7.1

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

SHORT TERM LATERAL BENDING MOMENT AT STATION 10 (FEET -L.TONS)

WAVE HT. (FEET)	ROOT MEAN SQUARE	BROADNESS EPS	PER HOUR
2.380	7.4411E+03	.67931	925.8
4.879	1.5243E+04	.67369	901.4
7.334	2.2194E+04	.66671	863.9
10.497	3.1763E+04	.66670	863.9
13.867	4.0316E+04	.66413	842.8
17.894	5.2912E+04	.66424	850.6
23.554	6.5916E+04	.66312	828.8
28.835	7.6497E+04	.66276	813.7
37.139	8.6367E+04	.66411	787.8
47.602	1.0744E+05	.66464	783.2

LONG TERM RESULTS FOR INDIVIDUAL WAVE HEIGHT GROUPS

WAVE HT. (FEET)	WIDE BAND CORR.	HIGHEST OCCURANCE IN			
		8.0 HRS	24.0 HRS	48.0 HRS	72.0 HRS
2.380	.8771	3.1268E+04	3.3352E+04	3.4633E+04	3.5341E+04
4.879	.8792	6.3127E+04	6.7331E+04	6.9913E+04	7.1344E+04
7.334	.8819	8.9880E+04	9.5847E+04	9.9507E+04	1.0154E+05
10.497	.8819	1.2863E+05	1.3716E+05	1.4240E+05	1.4532E+05
13.867	.8829	1.6125E+05	1.7193E+05	1.7847E+05	1.8213E+05
17.894	.8826	2.1260E+05	2.2669E+05	2.3532E+05	2.4014E+05
23.554	.8833	2.6151E+05	2.7880E+05	2.8939E+05	2.9531E+05
28.835	.8834	3.0090E+05	3.2075E+05	3.3293E+05	3.3972E+05
37.139	.8829	3.3481E+05	3.5679E+05	3.7030E+05	3.7782E+05
47.602	.8827	4.1543E+05	4.4267E+05	4.5941E+05	4.6875E+05

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

LONG TERM LATERAL BENDING MOMENT AT STATION 10 (FEET -L.TONS)

RESPONSE VALUE	PROBABILITY OF EXCEEDENCE	-LOG OF PROBABILITY	NUMBER IN LIFE	HISTOGRAM
0.	1.0000E+00	0.00	1.0000E+08	0.
3.7822E+04	1.8511E-01	.73	1.8511E+07	8.1489E+07
7.5644E+04	3.1794E-02	1.50	3.1794E+06	1.5331E+07
1.1347E+05	7.1405E-03	2.15	7.1405E+05	2.4653E+06
1.5129E+05	1.6902E-03	2.77	1.6902E+05	5.4503E+05
1.8911E+05	3.6178E-04	3.44	3.6178E+04	1.3285E+05
2.2693E+05	6.7096E-05	4.17	6.7096E+03	2.9468E+04
2.6476E+05	1.0841E-05	4.96	1.0841E+03	5.6255E+03
3.0258E+05	1.5739E-06	5.80	1.5739E+02	9.2668E+02
3.4040E+05	2.2010E-07	6.66	2.2010E+01	1.3538E+02
3.7822E+05	3.3027E-08	7.48	3.3027E+00	1.8708E+01
4.1604E+05	5.6822E-09	8.25	5.6822E-01	2.7345E+00
4.5387E+05	1.0610E-09	8.97	1.0610E-01	4.6213E-01
4.9169E+05	1.9448E-10	9.71	1.9448E-02	8.6649E-02
5.2951E+05	3.2870E-11	10.48	3.2870E-03	1.6161E-02
5.6733E+05	4.9917E-12	11.30	4.9917E-04	2.7879E-03
6.0516E+05	6.7489E-13	12.17	6.7489E-05	4.3168E-04
6.4298E+05	8.0972E-14	13.09	8.0972E-06	5.9392E-05
6.8080E+05	8.6095E-15	14.07	8.6095E-07	7.2363E-06
7.1862E+05	8.1069E-16	15.09	8.1069E-08	7.7988E-07
7.5644E+05	6.7574E-17	16.17	6.7574E-09	7.4312E-08
7.9427E+05	4.9845E-18	17.30	4.9845E-10	6.2590E-09
8.3209E+05	3.2528E-19	18.49	3.2528E-11	4.6592E-10
8.6991E+05	1.8776E-20	19.73	1.8776E-12	3.0650E-11
9.0773E+05	9.5850E-22	21.02	9.5850E-14	1.7818E-12
9.4556E+05	4.3267E-23	22.36	4.3267E-15	9.1524E-14
9.8338E+05	1.7268E-24	23.76	1.7268E-16	4.1540E-15
1.0212E+06	6.0927E-26	25.22	6.0927E-18	1.6659E-16
1.0590E+06	1.9003E-27	26.72	1.9003E-19	5.9027E-18
1.0968E+06	5.2388E-29	28.28	5.2388E-21	1.8479E-19
1.1347E+06	1.2765E-30	29.89	1.2765E-22	5.1111E-21

INTERPOLATED VALUES

MAXIMUM VALUE IN 10** 4 CYCLES = 2.1798E+05 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 5 CYCLES = 2.6634E+05 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 6 CYCLES = 3.1130E+05 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 7 CYCLES = 3.5613E+05 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 8 CYCLES = 4.0390E+05 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 9 CYCLES = 4.5519E+05 (AMPLITUDE)
 MAXIMUM VALUE IN 10**10 CYCLES = 5.0584E+05 (AMPLITUDE)

PL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE TORSIONAL MOMENT AT STATION 10 (FEET -L.TONS/ FEET)

		W A V E A N G L E					
		15.00 DEGREES		30.00 DEGREES		45.00 DEGREES	
WAVE	WAVE/SHIP	AMPLITUDE	PHASE	AMPLITUDE	PHASE	AMPLITUDE	PHASE
FREQ.	LENGTH						
.2000	5.7398	8.0427E+01	138.0	1.4445E+02	134.3	1.8138E+02	126.2
.2500	3.6735	2.0397E+02	126.9	3.8745E+02	122.5	5.4435E+02	112.4
.3000	2.5510	4.4208E+02	116.9	9.1516E+02	110.6	1.5566E+03	91.5
.3500	1.8742	8.0876E+02	107.8	1.8852E+03	97.4	3.6832E+03	50.7
.4000	1.4349	1.2200E+03	100.3	3.2198E+03	84.7	4.7069E+03	8.1
.4500	1.1338	1.5001E+03	94.5	4.4545E+03	76.9	4.8034E+03	-12.5
.5000	.9184	1.5201E+03	88.6	4.9189E+03	75.0	5.1023E+03	-21.9
.5500	.7590	1.4608E+03	88.6	4.3771E+03	74.6	5.6621E+03	-26.6
.6000	.6378	1.3789E+03	88.6	3.1679E+03	70.0	6.4566E+03	-28.1
.6500	.5434	1.2742E+03	88.6	1.9058E+03	55.5	7.4164E+03	-24.9
.7000	.4686	1.1469E+03	88.6	1.7924E+03	56.5	7.6339E+03	-10.1
.7500	.4082	9.9679E+02	88.5	1.6558E+03	58.0	4.1477E+03	6.1
.8000	.3587	8.2399E+02	83.5	1.4970E+03	60.1	2.1559E+03	-36.8
.8500	.3178	6.2848E+02	88.3	1.3177E+03	63.2	2.3590E+03	-66.4
.9000	.2834	4.1027E+02	88.0	1.1211E+03	67.8	2.1963E+03	-66.2
.9500	.2544	1.6938E+02	86.9	9.1433E+02	75.2	2.0094E+03	-65.9
1.0000	.2296	3.1462E+02	-127.7	7.1464E+02	88.1	1.7983E+03	-65.5
1.0500	.2082	5.3762E+01	-43.6	5.6739E+02	111.3	1.5632E+03	-65.0
1.1000	.1897	1.9166E+01	-11.8	1.8335E+02	-86.1	1.3041E+03	-64.1
1.1500	.1736	3.0384E+01	-170.0	8.6730E+01	34.8	1.0214E+03	-62.7
1.2000	.1594	3.4100E+01	167.9	3.3673E+01	152.3	7.1585E+02	-59.8
1.2500	.1469	2.1427E+01	11.5	7.3060E+01	170.5	3.9157E+02	-51.7
1.3000	.1359	2.9667E+01	-57.1	1.1387E+01	80.5	8.0450E+02	46.8
1.3500	.1260	3.4073E+01	-170.3	7.5979E+01	-21.8	8.2291E+01	122.8
1.4000	.1171	3.5703E+01	129.6	3.9295E+01	-112.2	7.5150E+01	-168.9
1.4500	.1092	9.0951E+00	-31.2	7.1052E+01	155.3	3.1461E+01	-20.5
1.5000	.1020	1.6909E+01	-124.4	3.4566E+01	92.2	8.8135E+01	-27.6
1.5500	.0956	1.5868E+01	107.7	3.7459E+01	-58.9	3.5034E+01	-94.4
1.6000	.0897	1.6797E+01	-11.3	2.0304E+01	-164.0	7.4700E+01	152.5
1.6500	.0843	2.7181E+00	46.1	2.7870E+01	96.6	3.5783E+01	94.7
1.7000	.0794	1.5533E+01	97.6	2.5456E+01	-50.0	5.1398E+01	-35.5
1.7500	.0750	2.0448E+01	-96.9	2.4646E+00	24.2	2.8652E+01	-82.7
1.8000	.0709	1.6207E+01	-13.3	2.6762E+01	90.2	3.9602E+01	119.0

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE TORSIONAL MOMENT AT STATION 10 (FEET -L.TONS/ FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	60.00 DEGREES		75.00 DEGREES		90.00 DEGREES	
		AMPLITUDE	PHASE	AMPLITUDE	PHASE	AMPLITUDE	PHASE
.2000	5.7398	1.9416E+02	110.3	2.1276E+02	81.9	2.9823E+02	43.6
.2500	3.6735	7.1864E+02	90.1	1.0849E+03	41.0	1.2690E+03	-37.0
.3000	2.5510	2.2901E+03	29.1	1.2475E+03	-45.5	7.9433E+02	-81.1
.3500	1.8742	1.9742E+03	-26.2	9.4983E+02	-64.2	7.1826E+02	-87.5
.4000	1.4343	1.6540E+03	-40.6	8.8039E+02	-70.0	7.3981E+02	-89.1
.4500	1.1338	1.5458E+03	-45.1	8.5831E+02	-72.7	7.9418E+02	-89.3
.5000	.9184	1.4915E+03	-45.5	8.3400E+02	-73.8	8.6483E+02	-89.1
.5500	.7590	1.4440E+03	-43.0	7.8696E+02	-73.5	9.4397E+02	-88.6
.6000	.6378	1.3945E+03	-37.8	7.0558E+02	-71.4	1.0370E+03	-88.3
.6500	.5434	1.3540E+03	-30.1	5.8938E+02	-65.6	1.1278E+03	-88.2
.7000	.4686	1.3314E+03	-21.0	4.6005E+02	-51.3	1.2242E+03	-88.4
.7500	.4082	1.3172E+03	-11.6	3.8458E+02	-20.7	1.2960E+03	-89.1
.8000	.3587	1.2725E+03	-2.7	4.7757E+02	13.3	1.3571E+03	-90.0
.8500	.3178	1.1535E+03	7.2	7.0371E+02	31.2	1.4027E+03	-91.0
.9000	.2834	9.5434E+02	22.5	9.6983E+02	38.1	1.4203E+03	-92.4
.9500	.2544	7.9294E+02	53.0	1.2183E+03	40.2	1.4119E+03	-93.8
1.0000	.2296	9.5722E+02	92.1	1.4119E+03	39.8	1.3820E+03	-95.2
1.0500	.2082	1.4340E+03	114.7	1.5229E+03	37.9	1.3287E+03	-96.8
1.1000	.1897	1.9493E+03	126.2	1.5335E+03	34.7	1.2560E+03	-98.5
1.1500	.1736	2.2457E+03	137.0	1.4368E+03	30.2	1.1662E+03	-100.4
1.2000	.1594	1.6900E+03	162.7	1.2440E+03	24.0	1.0656E+03	-102.3
1.2500	.1469	1.2646E+03	66.1	9.8461E+02	14.9	9.5724E+02	-104.3
1.3000	.1359	1.6411E+03	89.2	7.0591E+02	.4	8.4534E+02	-106.4
1.3500	.1260	1.5324E+03	89.7	4.7332E+02	-25.4	7.3409E+02	-108.5
1.4000	.1171	1.4142E+03	90.2	3.7398E+02	-65.7	6.3021E+02	-111.0
1.4500	.1092	1.2865E+03	91.0	3.9962E+02	-101.2	5.3166E+02	-113.4
1.5000	.1020	1.1495E+03	92.0	4.3465E+02	-123.5	4.4256E+02	-115.8
1.5500	.0956	1.0034E+03	93.4	4.1839E+02	-130.9	3.6414E+02	-118.1
1.6000	.0897	8.4854E+02	95.3	3.4632E+02	-156.0	2.9645E+02	-120.2
1.6500	.0843	6.8577E+02	98.4	2.4736E+02	-177.3	2.3928E+02	-122.0
1.7000	.0794	5.1707E+02	103.7	1.6585E+02	147.1	1.9191E+02	-123.4
1.7500	.0750	2.3308E+02	175.4	1.5040E+02	99.3	1.5314E+02	-124.4
1.8000	.0709	6.6056E+01	55.0	1.7529E+02	66.9	1.2197E+02	-124.7

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE TORSIONAL MOMENT AT STATION 10 (FEET -L.TONS/ FEET)

		W A V E A N G L E					
		105.00 DEGREES		120.00 DEGREES		135.00 DEGREES	
WAVE	WAVE/SHIP	AMPLITUDE	PHASE	AMPLITUDE	PHASE	AMPLITUDE	PHASE
FREQ.	LENGTH						
.2000	5.7398	4.7991E+02	21.8	7.1785E+02	-3.6	8.2382E+02	-32.4
.2500	3.6735	8.9787E+02	-81.7	6.4700E+02	-98.4	4.6179E+02	-105.3
.3000	2.5510	6.3312E+02	-96.8	5.0624E+02	-103.1	3.7389E+02	-106.2
.3500	1.8742	6.1474E+02	-97.1	4.8461E+02	-101.0	3.3014E+02	-104.3
.4000	1.4349	6.4120E+02	-95.2	4.5279E+02	-98.1	2.3931E+02	-105.9
.4500	1.1338	6.7024E+02	-92.3	3.7453E+02	-95.0	6.1375E+01	-141.5
.5000	.9184	6.8878E+02	-88.9	2.0278E+02	-86.2	2.5002E+02	97.0
.5500	.7590	6.7353E+02	-84.2	7.6713E+01	44.8	5.6045E+02	96.8
.6000	.6378	6.2696E+02	-76.9	3.6409E+02	79.1	8.5188E+02	100.9
.6500	.5434	5.2937E+02	-68.0	6.8621E+02	87.2	1.0580E+03	110.2
.7000	.4686	4.2494E+02	-53.7	9.8101E+02	96.0	1.1568E+03	123.4
.7500	.4082	3.2851E+02	-23.8	1.2101E+03	106.3	1.1586E+03	139.1
.8000	.3587	3.3169E+02	19.7	1.3621E+03	118.2	1.0636E+03	156.0
.8500	.3178	4.6840E+02	52.5	1.4318E+03	131.3	8.4992E+02	173.4
.9000	.2834	6.4400E+02	71.7	1.4127E+03	144.7	5.4037E+02	-164.3
.9500	.2544	8.2025E+02	85.0	1.2801E+03	158.1	2.8858E+02	-115.7
1.0000	.2296	9.6167E+02	96.2	1.0250E+03	172.0	3.2999E+02	-56.8
1.0500	.2082	1.0610E+03	106.0	6.8368E+02	-170.1	3.9031E+02	-40.4
1.1000	.1897	1.1038E+03	115.9	3.7342E+02	-134.9	3.0748E+02	-45.8
1.1500	.1736	1.0900E+03	125.8	3.1701E+02	-71.9	1.7667E+02	-81.0
1.2000	.1594	1.0179E+03	136.2	4.0896E+02	-39.5	1.6788E+02	-140.6
1.2500	.1469	8.9611E+02	147.5	3.9069E+02	-27.8	1.6437E+02	-163.2
1.3000	.1359	7.4102E+02	160.7	2.4900E+02	-23.0	4.6012E+01	-160.1
1.3500	.1260	5.7460E+02	177.0	4.8300E+01	-24.2	9.3496E+01	-0.0
1.4000	.1171	4.2580E+02	-161.4	1.2074E+02	163.8	1.0525E+02	2.3
1.4500	.1092	3.1974E+02	-132.9	1.8272E+02	164.2	2.8667E+01	-147.0
1.5000	.1020	2.6574E+02	-100.0	1.2143E+02	165.7	8.5906E+01	-152.2
1.5500	.0956	2.4393E+02	-69.3	3.2067E+01	56.5	2.8495E+01	-111.5
1.6000	.0897	2.2396E+02	-42.4	8.2348E+01	-5.3	6.3854E+01	13.3
1.6500	.0843	1.9821E+02	-17.3	9.9835E+01	-6.0	3.2920E+01	63.6
1.7000	.0794	1.6822E+02	8.6	1.8045E+01	73.3	3.2037E+01	-142.9
1.7500	.0750	1.3938E+02	36.5	7.4110E+01	164.8	3.4097E+00	-109.9
1.8000	.0709	1.1664E+02	67.0	5.8318E+01	172.3	2.0876E+01	67.5

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE TORSIONAL MOMENT AT STATION 10 (FEET -L.TONS/ FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	150.00 DEGREES		W A V E A N G L E 165.00 DEGREES	
		AMPLITUDE	PHASE	AMPLITUDE	PHASE
.2000	5.7398	6.3635E+02	-56.9	3.1958E+02	-70.5
.2500	3.6735	2.9934E+02	-108.3	1.4732E+02	-109.7
.3000	2.5510	2.4228E+02	-107.9	1.1740E+02	-109.3
.3500	1.8742	1.8838E+02	-109.2	8.1287E+01	-114.7
.4000	1.4349	9.1173E+01	-131.7	3.5574E+01	174.2
.4500	1.1338	1.4895E+02	112.1	1.3213E+02	107.7
.5000	.9184	3.9910E+02	102.5	2.6091E+02	104.6
.5500	.7590	6.1754E+02	105.0	3.6098E+02	109.2
.6000	.6378	7.5718E+02	112.9	4.0497E+02	121.0
.6500	.5434	8.0060E+02	127.2	3.9152E+02	139.2
.7000	.4686	7.6165E+02	145.4	3.3844E+02	160.3
.7500	.4082	6.4711E+02	165.3	2.4538E+02	-175.9
.8000	.3587	4.4988E+02	-172.0	1.3514E+02	-137.4
.8500	.3178	2.4091E+02	-131.3	1.1600E+02	-71.0
.9000	.2834	2.2710E+02	-66.1	1.4685E+02	-48.1
.9500	.2544	2.8299E+02	-45.7	1.3207E+02	-57.9
1.0000	.2296	2.4598E+02	-54.2	1.0147E+02	-92.0
1.0500	.2082	1.7548E+02	-89.3	8.8946E+01	-128.8
1.1000	.1897	1.5813E+02	-131.4	5.1514E+01	-139.7
1.1500	.1736	1.0995E+02	-148.1	2.6898E+01	-24.0
1.2000	.1594	2.7202E+01	-45.1	4.8858E+01	-7.4
1.2500	.1469	9.3637E+01	-2.2	2.4711E+01	-77.3
1.3000	.1359	4.2824E+01	-28.2	6.8314E+02	-46.1
1.3500	.1260	6.8384E+01	-140.2	1.5947E+01	-20.2
1.4000	.1171	3.9281E+01	-107.9	2.9061E+01	65.2
1.4500	.1092	4.3517E+01	45.9	2.6477E+00	13.7
1.5000	.1020	3.1756E+01	71.2	1.8165E+01	-36.3
1.5500	.0956	2.7436E+01	-92.0	9.1586E+00	110.3
1.6000	.0897	1.6649E+01	5.2	1.3214E+01	-138.4
1.6500	.0843	1.3021E+01	140.3	1.2509E+01	53.2
1.7000	.0794	2.2055E+01	-95.7	1.2978E+01	-154.6
1.7500	.0750	1.0659E+02	10.4	3.9294E+01	3.0
1.8000	.0709	1.7025E+01	-129.3	1.5832E+02	-3.6

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

SHORT TERM TORSIONAL MOMENT AT STATION 10 (FEET -L.TONS)

WAVE HT. (FEET)	ROOT MEAN SQUARE	BROADNESS EPS	PER HOUR
2.380	8.8217E+02	.74482	783.3
4.879	1.9093E+03	.73675	753.6
7.334	3.0579E+03	.72358	708.8
10.497	4.3771E+03	.72356	708.7
13.867	5.9120E+03	.71617	682.9
17.894	7.5769E+03	.71885	692.5
23.554	1.0120E+04	.71152	665.1
28.835	1.2397E+04	.70706	644.7
37.139	1.5589E+04	.70197	604.0
47.602	1.9811E+04	.70163	595.6

LONG TERM RESULTS FOR INDIVIDUAL WAVE HEIGHT GROUPS

WAVE HT. (FEET)	WIDE BAND CORR.	HIGHEST OCCURANCE IN			
		8.0 HRS	24.0 HRS	48.0 HRS	72.0 HRS
2.380	.8501	4.3441E+03	4.6702E+03	4.8686E+03	4.9811E+03
4.879	.8536	9.7757E+03	1.0517E+04	1.0966E+04	1.1221E+04
7.334	.8592	1.6569E+04	1.7836E+04	1.8599E+04	1.9033E+04
10.497	.8592	2.3719E+04	2.5533E+04	2.6625E+04	2.7246E+04
13.867	.8623	3.2985E+04	3.5515E+04	3.7031E+04	3.7896E+04
17.894	.8612	4.1836E+04	4.5042E+04	4.6966E+04	4.8062E+04
23.554	.8642	5.7464E+04	6.1879E+04	6.4515E+04	6.6023E+04
28.835	.8660	7.1554E+04	7.7059E+04	8.0336E+04	8.2214E+04
37.139	.8681	9.1724E+04	9.8792E+04	1.0298E+05	1.0539E+05
47.602	.8682	1.1676E+05	1.2575E+05	1.3108E+05	1.3415E+05

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

LONG TERM TORSIONAL MOMENT AT STATION 10 (FEET -L.TONS)

RESPONSE VALUE	PROBABILITY OF EXCEEDENCE	-LOG OF PROBABILITY	NUMBER IN LIFE	HISTOGRAM
0.	1.0000E+00	0.00	1.0000E+08	0.
1.1533E+04	3.6876E-02	1.43	3.6876E+06	9.6312E+07
2.3065E+04	4.8012E-03	2.32	4.8012E+05	3.2075E+06
3.4598E+04	8.8152E-04	3.05	8.8152E+04	3.9197E+05
4.6130E+04	1.5535E-04	3.81	1.5535E+04	7.2618E+04
5.7663E+04	2.4345E-05	4.61	2.4345E+03	1.3100E+04
6.9196E+04	3.6358E-06	5.44	3.6358E+02	2.0709E+03
8.0728E+04	6.0064E-07	6.22	6.0064E+01	3.0352E+02
9.2261E+04	1.2545E-07	6.90	1.2545E+01	4.7518E+01
1.0379E+05	3.0959E-08	7.51	3.0959E+00	9.4495E+00
1.1533E+05	7.7662E-09	8.11	7.7662E-01	2.3193E+00
1.2686E+05	1.8265E-09	8.74	1.8265E-01	5.9398E-01
1.3839E+05	3.9064E-10	9.41	3.9064E-02	1.4358E-01
1.4992E+05	7.5004E-11	10.12	7.5004E-03	3.1563E-02
1.6146E+05	1.2844E-11	10.89	1.2844E-03	6.2160E-03
1.7299E+05	1.9548E-12	11.71	1.9548E-04	1.0889E-03
1.8452E+05	2.6394E-13	12.58	2.6394E-05	1.6909E-04
1.9605E+05	3.1582E-14	13.50	3.1582E-06	2.3236E-05
2.0759E+05	3.3470E-15	14.48	3.3470E-07	2.8235E-06
2.1912E+05	3.1406E-16	15.50	3.1406E-08	3.0330E-07
2.3065E+05	2.6087E-17	16.58	2.6087E-09	2.8798E-08
2.4218E+05	1.9179E-18	17.72	1.9179E-10	2.4169E-09
2.5372E+05	1.2480E-19	18.90	1.2480E-11	1.7931E-10
2.6525E+05	7.1883E-21	20.14	7.1883E-13	1.1761E-11
2.7678E+05	3.6650E-22	21.44	3.6650E-14	6.8218E-13
2.8831E+05	1.6542E-23	22.78	1.6542E-15	3.4996E-14
2.9985E+05	6.6099E-25	24.18	6.6099E-17	1.5881E-15
3.1138E+05	2.3382E-26	25.63	2.3382E-18	6.3761E-17
3.2291E+05	7.3223E-28	27.14	7.3223E-20	2.2650E-18
3.3445E+05	2.0297E-29	28.69	2.0297E-21	7.1193E-20
3.4598E+05	4.9794E-31	30.30	4.9794E-23	1.9799E-21

INTERPOLATED VALUES

MAXIMUM VALUE IN 10** 4 CYCLES = 4.8871E+04 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 5 CYCLES = 6.3059E+04 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 6 CYCLES = 7.7463E+04 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 7 CYCLES = 9.4130E+04 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 8 CYCLES = 1.1322E+05 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 9 CYCLES = 1.3136E+05 (AMPLITUDE)
 MAXIMUM VALUE IN 10**10 CYCLES = 1.4791E+05 (AMPLITUDE)

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE VERTICAL SHEAR FORCE AT STATION 10 (L.TONS/ FEET)

		W A V E A N G L E					
		0.00 DEGREES		15.00 DEGREES		30.00 DEGREES	
WAVE FREQ.	WAVE/SHIP LENGTH	AMPLITUDE	PHASE	AMPLITUDE	PHASE	AMPLITUDE	PHASE
.2000	5.7398	3.6104E+00	-66.2	3.4308E+00	-65.6	2.9381E+00	-63.4
.2500	3.6735	6.9318E+00	-63.7	6.5041E+00	-63.5	5.3468E+00	-62.1
.3000	2.5510	1.3413E+01	-59.9	1.2468E+01	-60.0	9.9378E+00	-59.7
.3500	1.8742	2.5257E+01	-55.5	2.3414E+01	-55.9	1.8504E+01	-56.7
.4000	1.4349	4.4597E+01	-50.6	4.1450E+01	-51.3	3.2777E+01	-53.1
.4500	1.1338	7.2351E+01	-44.8	6.7520E+01	-46.0	5.4204E+01	-49.0
.5000	.9184	1.0722E+02	-37.7	1.0076E+02	-39.5	8.2734E+01	-44.1
.5500	.7590	9.9196E+01	-35.8	9.3240E+01	-37.2	1.1620E+02	-38.0
.6000	.6378	8.8592E+01	-32.6	8.3159E+01	-33.2	1.4955E+02	-30.6
.6500	.5434	7.5751E+01	-27.4	7.1062E+01	-26.4	1.8090E+02	-21.8
.7000	.4686	6.1478E+01	-18.4	5.8245E+01	-14.7	1.6620E+02	-19.9
.7500	.4082	4.7940E+01	-1.5	4.8000E+01	6.0	1.4869E+02	-16.9
.8000	.3587	4.0940E+01	28.4	4.6997E+01	36.4	1.2875E+02	-12.5
.8500	.3178	4.8475E+01	62.3	5.9963E+01	63.6	1.0716E+02	-5.4
.9000	.2834	6.9368E+01	83.7	8.3770E+01	80.3	8.5765E+01	6.6
.9500	.2544	9.8032E+01	95.2	1.1442E+02	89.8	6.9206E+01	27.8
1.0000	.2296	5.9143E+01	97.8	7.3369E+01	95.1	6.6699E+01	58.5
1.0500	.2082	3.6241E+01	84.9	4.2827E+01	88.8	8.4062E+01	86.0
1.1000	.1897	3.1523E+01	72.0	3.2805E+01	72.8	4.9085E+01	83.3
1.1500	.1736	2.4889E+01	75.2	2.8471E+01	71.0	3.3966E+01	69.8
1.2000	.1594	1.2124E+01	74.9	1.7522E+01	75.8	2.8699E+01	65.0
1.2500	.1469	5.8502E+00	13.2	6.2114E+00	50.6	1.9889E+01	69.9
1.3000	.1359	6.6277E+00	3.1	6.5241E+00	2.1	8.7861E+00	67.5
1.3500	.1260	4.3753E+00	2.2	5.0164E+00	2.2	4.4439E+00	13.8
1.4000	.1171	2.3317E+00	-6.0	2.9349E+00	3.6	4.7875E+00	1.8
1.4500	.1092	1.1697E+00	-102.2	9.7563E-01	-19.1	2.5712E+00	2.7
1.5000	.1020	1.2154E+00	-102.8	1.5453E+00	-119.6	1.3517E+00	12.6
1.5500	.0956	2.4930E+00	53.8	6.9857E-01	-40.9	3.0900E-01	109.1
1.6000	.0897	5.7123E+00	92.1	3.6366E+00	66.5	1.4866E+00	-135.4
1.6500	.0843	4.4017E+00	112.6	4.9717E+00	108.2	1.1511E+00	-47.6
1.7000	.0794	5.7800E+00	40.0	1.5785E+00	108.4	2.6064E+00	52.1
1.7500	.0750	1.2167E+01	59.5	6.9160E+00	34.9	3.0329E+00	125.0
1.8000	.0709	6.6192E+00	75.3	9.3818E+00	74.5	2.3647E+00	-133.8

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE VERTICAL SHEAR FORCE AT STATION 10 (L.TONS/ FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	45.00 DEGREES		60.00 DEGREES		75.00 DEGREES	
		AMPLITUDE	PHASE	AMPLITUDE	PHASE	AMPLITUDE	PHASE
.2000	5.7398	2.2614E+00	-57.9	1.5958E+00	-44.9	1.1827E+00	-19.2
.2500	3.6735	3.8100E+00	-57.5	2.4074E+00	-43.2	1.7242E+00	-12.1
.3000	2.5510	6.6205E+00	-56.8	3.5867E+00	-43.0	2.3461E+00	-4.9
.3500	1.8742	1.1705E+01	-55.8	5.5013E+00	-44.5	3.0523E+00	1.6
.4000	1.4349	2.0433E+01	-54.3	8.7475E+00	-47.0	3.8185E+00	6.7
.4500	1.1338	3.4164E+01	-52.1	1.4079E+01	-49.1	4.6015E+00	9.7
.5000	.9184	5.3736E+01	-49.2	2.2260E+01	-50.1	5.3509E+00	10.4
.5500	.7590	7.8866E+01	-45.5	3.3909E+01	-50.0	6.0470E+00	8.0
.6000	.6378	1.0778E+02	-40.9	4.9187E+01	-48.7	6.7678E+00	2.2
.6500	.5434	1.3710E+02	-35.4	6.7600E+01	-46.4	7.7444E+00	-6.7
.7000	.4686	1.6264E+02	-29.0	8.7816E+01	-43.3	9.3350E+00	-17.0
.7500	.4082	1.8043E+02	-22.1	1.0769E+02	-39.5	1.1855E+01	-26.0
.8000	.3587	1.8802E+02	-15.1	1.2449E+02	-35.0	1.5416E+01	-32.0
.8500	.3178	1.8497E+02	-8.7	1.3538E+02	-30.1	1.9918E+01	-34.9
.9000	.2834	1.7053E+02	-7.9	1.3799E+02	-24.9	2.5167E+01	-35.4
.9500	.2544	1.5401E+02	-6.7	1.3113E+02	-20.1	3.0625E+01	-34.1
1.0000	.2296	1.3544E+02	-5.0	1.1549E+02	-16.3	3.5838E+01	-31.5
1.0500	.2082	1.1492E+02	-2.5	9.4076E+01	-14.9	4.0055E+01	-28.1
1.1000	.1897	9.2661E+01	1.5	7.2163E+01	-18.0	4.2820E+01	-23.9
1.1500	.1736	6.9206E+01	8.8	5.6016E+01	-26.4	4.3227E+01	-19.2
1.2000	.1594	4.6388E+01	24.9	4.7766E+01	-35.2	4.0806E+01	-13.9
1.2500	.1469	3.2205E+01	64.8	4.2270E+01	-36.2	3.5337E+01	-7.8
1.3000	.1359	2.3576E+01	53.0	3.3945E+01	-26.5	2.6999E+01	-6
1.3500	.1260	1.8035E+01	55.4	3.0152E+01	-27.3	1.6642E+01	9.6
1.4000	.1171	1.0180E+01	66.0	2.6032E+01	-28.6	5.9535E+00	36.8
1.4500	.1092	3.1958E+00	67.4	2.1596E+01	-30.5	6.2303E+00	162.3
1.5000	.1020	1.3526E+00	-14.9	1.6865E+01	-33.6	1.3646E+01	-171.8
1.5500	.0956	1.2590E+00	-20.8	1.1905E+01	-39.7	1.7681E+01	-158.0
1.6000	.0897	3.4880E-01	-34.7	6.9872E+00	-55.6	1.7507E+01	-144.6
1.6500	.0843	3.3914E-01	35.2	4.1213E+00	-112.5	1.3585E+01	-127.0
1.7000	.0794	9.4914E-01	69.9	7.6275E+00	-166.8	7.7974E+00	-94.4
1.7500	.0750	1.1699E+00	143.0	6.5218E+00	-136.5	5.5952E+00	-15.3
1.8000	.0709	1.7351E+00	-135.1	2.6484E+00	-98.3	9.4117E+00	39.4

BL-1 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE VERTICAL SHEAR FORCE AT STATION 10 (L.TONS/ FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	90.00 DEGREES		WAVE ANGLE 105.00 DEGREES		120.00 DEGREES	
		AMPLITUDE	PHASE	AMPLITUDE	PHASE	AMPLITUDE	PHASE
.2000	5.7398	1.1645E+00	10.5	1.3225E+00	30.2	1.4699E+00	42.0
.2500	3.6735	1.8392E+00	13.9	2.0348E+00	22.8	1.9800E+00	25.7
.3000	2.5510	2.7023E+00	15.7	2.9219E+00	10.2	2.6249E+00	-4.9
.3500	1.8742	3.7276E+00	16.2	4.1606E+00	-7.4	4.4332E+00	-42.5
.4000	1.4349	4.8589E+00	15.3	6.2115E+00	-28.1	8.8676E+00	-70.6
.4500	1.1338	5.9947E+00	13.1	9.8288E+00	-48.4	1.7418E+01	-90.1
.5000	.9184	6.9897E+00	9.3	1.5989E+01	-64.8	3.2831E+01	-106.1
.5500	.7590	7.6460E+00	3.6	2.6258E+01	-82.8	6.0863E+01	-127.6
.6000	.6278	7.7092E+00	-5.1	4.1744E+01	-101.7	9.9207E+01	-162.1
.6500	.5434	6.9646E+00	-21.5	6.4866E+01	-123.3	9.7562E+01	161.0
.7000	.4686	5.2520E+00	-52.3	7.6103E+01	-165.5	7.6675E+01	146.6
.7500	.4082	5.7535E+00	-125.5	5.8992E+01	164.2	6.4774E+01	144.8
.8000	.3587	1.3015E+01	-178.0	3.8498E+01	152.0	5.7368E+01	144.9
.8500	.3178	2.1776E+01	146.9	2.5288E+01	155.2	4.8683E+01	142.6
.9000	.2834	2.8019E+01	117.4	1.8156E+01	174.9	3.4608E+01	137.5
.9500	.2544	2.8469E+01	97.5	1.7160E+01	-168.0	1.5806E+01	126.6
1.0000	.2296	2.6251E+01	85.4	1.7103E+01	-156.2	6.0749E+00	-18.9
1.0500	.2082	2.3388E+01	78.1	1.5713E+01	-151.0	2.3854E+01	-47.1
1.1000	.1897	1.9810E+01	74.6	1.2988E+01	-145.6	3.5329E+01	-56.6
1.1500	.1736	1.6071E+01	74.4	9.1997E+00	-136.7	3.7274E+01	-64.6
1.2000	.1594	1.2774E+01	76.7	5.5726E+00	-112.8	3.0163E+01	-72.0
1.2500	.1469	9.7328E+00	83.0	4.6754E+00	-63.6	1.7293E+01	-77.2
1.3000	.1359	7.4027E+00	93.5	6.3643E+00	-33.8	4.5910E+00	-55.4
1.3500	.1260	5.7766E+00	109.1	7.2636E+00	-24.1	6.6971E+00	42.7
1.4000	.1171	4.8536E+00	128.7	6.4920E+00	-21.1	8.9960E+00	36.0
1.4500	.1092	4.4994E+00	146.4	3.8896E+00	-18.7	6.0840E+00	6.5
1.5000	.1020	4.2832E+00	160.1	4.8932E-01	53.9	3.7980E+00	-75.1
1.5500	.0956	3.9516E+00	170.2	4.1803E+00	141.4	5.7750E+00	-141.4
1.6000	.0897	3.4222E+00	178.2	7.6734E+00	140.0	6.1261E+00	177.9
1.6500	.0843	2.7322E+00	-174.6	9.6836E+00	135.4	4.4969E+00	133.6
1.7000	.0794	1.9250E+00	-165.4	9.7742E+00	129.1	2.0760E+00	65.6
1.7500	.0750	1.1499E+00	-148.7	8.0393E+00	120.6	2.3574E+00	-57.3
1.8000	.0709	6.4954E-01	-104.6	5.0618E+00	107.9	3.8586E+00	-117.3

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE VERTICAL SHEAR FORCE AT STATION 10 (L.TONS/ FEET)

		W A V E A N G L E					
		135.00 DEGREES		150.00 DEGREES		165.00 DEGREES	
WAVE	WAVE/SHIP	AMPLITUDE	PHASE	AMPLITUDE	PHASE	AMPLITUDE	PHASE
FREQ.	LENGTH						
.2000	5.7398	1.5553E+00	51.1	1.6052E+00	59.1	1.6399E+00	64.9
.2500	3.6735	1.6796E+00	30.3	1.3125E+00	42.0	1.0961E+00	59.3
.3000	2.5510	1.8485E+00	-27.7	1.1187E+00	-77.6	1.4291E+00	-133.1
.3500	1.8742	4.7458E+00	-82.9	5.9780E+00	-120.9	7.8102E+00	-142.2
.4000	1.4342	1.2061E+01	-107.5	1.6716E+01	-136.4	2.1550E+01	-152.1
.4500	1.1338	2.6412E+01	-123.4	3.8860E+01	-149.1	5.0576E+01	-162.5
.5000	.9184	5.5230E+01	-141.9	8.7254E+01	-167.9	1.1271E+02	176.0
.5500	.7590	1.0809E+02	-173.0	1.3547E+02	154.8	1.4259E+02	142.0
.6000	.6378	1.1887E+02	150.5	1.2515E+02	135.9	1.3123E+02	131.5
.6500	.5434	1.0334E+02	138.2	1.1487E+02	131.4	1.1770E+02	127.9
.7000	.4686	9.3500E+01	135.2	9.8177E+01	127.3	8.9207E+01	122.8
.7500	.4082	8.1017E+01	131.4	6.6192E+01	121.3	4.4176E+01	116.2
.8000	.3587	5.7737E+01	125.4	2.3572E+01	110.5	3.0407E+00	-66.2
.8500	.3178	2.5514E+01	113.5	1.6848E+01	-62.2	3.3947E+01	-79.1
.9000	.2834	1.0158E+01	-35.1	3.9526E+01	-75.2	3.8362E+01	-87.1
.9500	.2544	3.4809E+01	-62.1	3.9069E+01	-82.4	2.2009E+01	-85.3
1.0000	.2296	4.4035E+01	-71.4	2.2245E+01	-77.9	1.2543E+01	-19.8
1.0500	.2082	3.6396E+01	-76.9	1.3600E+01	-19.4	2.2842E+01	-2.9
1.1000	.1897	1.9685E+01	-69.3	2.2091E+01	-1.0	2.4724E+01	-19.3
1.1500	.1736	1.2502E+01	-14.2	2.3354E+01	-15.9	1.8336E+01	-30.2
1.2000	.1594	1.8313E+01	4.6	1.7280E+01	-31.0	1.2137E+01	-5.1
1.2500	.1469	1.8301E+01	-9.7	9.7039E+00	-16.0	1.4523E+01	17.4
1.3000	.1359	1.2974E+01	-33.1	1.0818E+01	18.5	1.2582E+01	12.5
1.3500	.1260	5.7061E+00	-47.7	1.0817E+01	14.3	6.9798E+00	19.9
1.4000	.1171	3.2847E+00	29.5	5.7730E+00	8.4	7.9215E+00	59.2
1.4500	.1092	5.8088E+00	28.6	3.3354E+00	52.9	4.2360E+00	33.1
1.5000	.1020	4.1149E+00	-4.5	3.6315E+00	37.5	1.5040E+00	77.9
1.5500	.0956	1.2056E+00	-101.3	1.4975E+00	1.2	1.5762E+00	80.9
1.6000	.0897	1.7488E+00	136.7	1.5248E+00	141.8	2.7928E+00	-76.1
1.6500	.0843	1.6359E+00	44.0	1.5735E+00	64.0	3.8419E+00	-128.3
1.7000	.0794	2.1982E+00	-52.2	2.2566E+00	-52.8	1.0622E+00	-49.3
1.7500	.0750	2.1197E+00	-146.4	6.6610E-01	-120.4	6.7081E+00	-58.5
1.8000	.0709	2.3976E+00	120.8	1.8742E+00	85.5	5.7671E+00	-91.7

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE VERTICAL SHEAR FORCE AT STATION 10 (L.TONS/ FEET)

W A V E A N G L E

WAVE	WAVE/SHIP	180.00 DEGREES	
FREQ.	LENGTH	AMPLITUDE	PHASE
.2000	5.7398	1.6541E+00	67.0
.2500	3.6735	1.0523E+00	68.0
.3000	2.5510	1.7569E+00	-146.1
.3500	1.8742	8.6643E+00	-148.4
.4000	1.4349	2.3327E+01	-156.6
.4500	1.1338	5.5394E+01	-166.6
.5000	.9184	1.2154E+02	170.6
.5500	.7590	1.4425E+02	139.0
.6000	.6378	1.3317E+02	130.4
.6500	.5434	1.1719E+02	126.7
.7000	.4686	8.4091E+01	121.4
.7500	.4082	3.5465E+01	115.0
.8000	.3587	1.1063E+01	-76.9
.8500	.3178	3.6704E+01	-83.5
.9000	.2834	3.4608E+01	-90.5
.9500	.2544	1.5700E+01	-79.0
1.0000	.2296	1.5503E+01	-5.1
1.0500	.2082	2.4630E+01	-7.9
1.1000	.1897	2.3648E+01	-25.5
1.1500	.1736	1.5873E+01	-26.1
1.2000	.1594	1.3552E+01	8.5
1.2500	.1469	1.5496E+01	16.4
1.3000	.1359	1.1103E+01	12.0
1.3500	.1260	6.7712E+00	31.3
1.4000	.1171	5.9624E+00	37.5
1.4500	.1092	3.1187E+00	40.9
1.5000	.1020	2.0366E+00	93.0
1.5500	.0956	1.3798E+00	-17.3
1.6000	.0897	3.7559E+00	-95.8
1.6500	.0843	3.4046E+00	15.0
1.7000	.0794	6.2307E+00	-51.9
1.7500	.0750	9.4219E+00	-78.4
1.8000	.0709	5.7721E+00	-42.8

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

SHORT TERM VERTICAL SHEAR FORCE AT STATION 10 (L.TONS)

WAVE HT. (FEET)	ROOT MEAN SQUARE	BROADNESS EPS	PER HOUR
2.380	4.6332E+01	.73178	774.8
4.879	9.7848E+01	.71360	760.0
7.334	1.4989E+02	.68672	739.5
10.497	2.1310E+02	.68668	739.5
13.867	2.7629E+02	.67283	728.8
17.894	3.5993E+02	.67779	732.7
23.554	4.5713E+02	.66435	722.1
28.835	5.3600E+02	.65601	715.2
37.139	6.1165E+02	.64360	704.1
47.602	7.6152E+02	.64169	702.2

LONG TERM RESULTS FOR INDIVIDUAL WAVE HEIGHT GROUPS

WAVE HT. (FEET)	WIDE BAND CORR.	HIGHEST OCCURANCE IN			
		8.0 HRS	24.0 HRS	48.0 HRS	72.0 HRS
2.380	.8557	1.8232E+02	1.9557E+02	2.0350E+02	2.0814E+02
4.879	.8634	3.8221E+02	4.0965E+02	4.2609E+02	4.3570E+02
7.334	.8742	5.8817E+02	6.2900E+02	6.5364E+02	6.6803E+02
10.497	.8742	8.4185E+02	9.0027E+02	9.3555E+02	9.5614E+02
13.867	.8796	1.1095E+03	1.1860E+03	1.2327E+03	1.2589E+03
17.894	.8777	1.4361E+03	1.5352E+03	1.5954E+03	1.6298E+03
23.554	.8828	1.8584E+03	1.9865E+03	2.0654E+03	2.1086E+03
28.835	.8859	2.2065E+03	2.3595E+03	2.4530E+03	2.5053E+03
37.139	.8904	2.5657E+03	2.7449E+03	2.8538E+03	2.9156E+03
47.602	.8911	3.2035E+03	3.4274E+03	3.5635E+03	3.6407E+03

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

LONG TERM VERTICAL SHEAR FORCE AT STATION 10 (L.TONS)

RESPONSE VALUE	PROBABILITY OF EXCEEDENCE	-LOG OF PROBABILITY	NUMBER IN LIFE	HISTOGRAM
0.	1.0000E+00	0.00	1.0000E+03	0.
3.0084E+02	1.2452E-01	.90	1.2452E+07	8.7548E+07
6.0167E+02	1.8666E-02	1.73	1.8666E+06	1.0586E+07
9.0251E+02	3.8069E-03	2.42	3.8069E+05	1.4859E+06
1.2033E+03	8.0080E-04	3.10	8.0080E+04	3.0061E+05
1.5042E+03	1.5210E-04	3.82	1.5210E+04	6.4870E+04
1.8050E+03	2.5239E-05	4.60	2.5239E+03	1.2686E+04
2.1058E+03	3.7491E-06	5.43	3.7491E+02	2.1490E+03
2.4067E+03	5.3878E-07	6.27	5.3878E+01	3.2103E+02
2.7075E+03	8.5499E-08	7.07	8.5499E+00	4.5328E+01
3.0084E+03	1.6230E-08	7.79	1.6230E+00	6.9270E+00
3.3092E+03	3.4020E-09	8.47	3.4020E-01	1.2828E+00
3.6100E+03	6.9783E-10	9.16	6.9783E-02	2.7042E-01
3.9109E+03	1.3132E-10	9.88	1.3132E-02	5.6651E-02
4.2117E+03	2.2141E-11	10.65	2.2141E-03	1.0917E-02
4.5125E+03	3.3184E-12	11.48	3.3184E-04	1.8823E-03
4.8134E+03	4.4076E-13	12.36	4.4076E-05	2.8776E-04
5.1142E+03	5.1820E-14	13.29	5.1820E-06	3.8894E-05
5.4150E+03	5.3902E-15	14.27	5.3902E-07	4.6430E-06
5.7159E+03	4.9595E-16	15.30	4.9595E-08	4.8942E-07
6.0167E+03	4.0364E-17	16.39	4.0364E-09	4.5558E-08
6.3175E+03	2.9062E-18	17.54	2.9062E-10	3.7458E-09
6.6184E+03	1.8512E-19	18.73	1.8512E-11	2.7211E-10
6.9192E+03	1.0434E-20	19.98	1.0434E-12	1.7469E-11
7.2201E+03	5.2050E-22	21.28	5.2050E-14	9.9139E-13
7.5209E+03	2.2981E-23	22.64	2.2981E-15	4.9751E-14
7.8217E+03	8.9824E-25	24.05	8.9824E-17	2.2083E-15
8.1226E+03	3.1083E-26	25.51	3.1083E-18	8.6716E-17
8.4234E+03	9.5238E-28	27.02	9.5238E-20	3.0131E-18
8.7242E+03	2.5839E-29	28.59	2.5839E-21	9.2655E-20
9.0251E+03	6.2073E-31	30.21	6.2073E-23	2.5218E-21

INTERPOLATED VALUES

MAXIMUM VALUE IN 10** 4 CYCLES = 1.5744E+03 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 5 CYCLES = 1.9511E+03 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 6 CYCLES = 2.3108E+03 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 7 CYCLES = 2.6819E+03 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 8 CYCLES = 3.1016E+03 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 9 CYCLES = 3.5417E+03 (AMPLITUDE)
 MAXIMUM VALUE IN 10**10 CYCLES = 3.9569E+03 (AMPLITUDE)

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE LATERAL SHEAR FORCE AT STATION 10 (L.TONS/ FEET)

		W A V E A N G L E					
		15.00 DEGREES		30.00 DEGREES		45.00 DEGREES	
WAVE	WAVE/SHIP	AMPLITUDE	PHASE	AMPLITUDE	PHASE	AMPLITUDE	PHASE
FREQ.	LENGTH						
.2000	5.7398	5.6962E-01	-29.5	9.9126E-01	-32.7	1.1880E+00	-38.9
.2500	3.6735	1.2426E+00	-18.6	2.1044E+00	-20.6	2.3924E+00	-24.8
.3000	2.5510	2.5369E+00	-12.8	4.2735E+00	-13.4	4.8922E+00	-15.1
.3500	1.8742	4.7871E+00	-10.8	8.1446E+00	-10.5	9.7779E+00	-14.5
.4000	1.4349	8.2765E+00	-11.5	1.4294E+01	-10.6	1.6062E+01	-18.5
.4500	1.1338	1.3097E+01	-13.6	2.2906E+01	-12.4	2.4604E+01	-19.9
.5000	.9184	1.8958E+01	-16.7	3.3564E+01	-15.1	3.6704E+01	-19.4
.5500	.7590	1.8660E+01	-18.3	4.5354E+01	-18.2	5.2141E+01	-20.7
.6000	.6378	1.8276E+01	-20.7	5.6446E+01	-21.5	6.9671E+01	-22.6
.6500	.5434	1.7833E+01	-23.9	6.4167E+01	-24.9	8.6932E+01	-24.6
.7000	.4686	1.7374E+01	-28.0	6.1137E+01	-26.1	1.0049E+02	-26.7
.7500	.4082	1.6952E+01	-33.1	5.7505E+01	-27.8	1.0516E+02	-27.7
.8000	.3587	1.6639E+01	-39.2	5.3310E+01	-30.1	1.0046E+02	-29.9
.8500	.3178	1.6521E+01	-46.3	4.8615E+01	-33.2	8.8019E+01	-32.6
.9000	.2834	1.6689E+01	-54.2	4.3523E+01	-37.6	8.1986E+01	-33.2
.9500	.2544	1.7232E+01	-62.5	3.8219E+01	-43.7	7.5069E+01	-34.0
1.0000	.2296	1.6726E+01	-65.3	3.3045E+01	-52.6	6.7278E+01	-35.1
1.0500	.2082	1.5063E+01	-67.6	2.8641E+01	-65.7	5.8634E+01	-36.7
1.1000	.1897	1.2775E+01	-73.1	2.5342E+01	-67.5	4.9174E+01	-39.2
1.1500	.1736	1.0062E+01	-80.6	2.0940E+01	-73.9	3.8985E+01	-43.2
1.2000	.1594	7.4286E+00	-84.6	1.6814E+01	-83.9	2.8305E+01	-50.8
1.2500	.1469	5.7699E+00	-77.1	1.3142E+01	-90.2	1.8028E+01	-68.7
1.3000	.1359	4.2607E+00	-72.4	9.9216E+00	-85.7	1.2293E+01	-85.2
1.3500	.1260	1.9986E+00	-124.3	7.5478E+00	-71.9	1.0036E+01	-102.7
1.4000	.1171	2.2104E+00	-150.5	3.6659E+00	-80.1	8.2011E+00	-104.4
1.4500	.1092	1.6680E+00	-87.2	3.2095E+00	-169.7	5.9262E+00	-91.1
1.5000	.1020	5.0605E-01	12.0	2.8117E+00	-135.9	3.6558E+00	-61.4
1.5500	.0956	1.3717E+00	127.3	2.7898E+00	-52.5	1.2902E+00	-7.1
1.6000	.0897	5.4408E-01	-99.7	1.7273E+00	61.9	2.6118E+00	143.6
1.6500	.0843	1.6508E+00	-7.5	2.4397E+00	143.6	3.0083E+00	-176.6
1.7000	.0794	1.3999E+00	41.9	1.7401E+00	-98.6	3.4779E+00	-69.5
1.7500	.0750	7.1058E-01	-48.5	2.2187E+00	-9.5	3.4941E+00	-1.0
1.8000	.0709	2.4130E+00	-34.9	1.8044E+00	82.8	3.2340E+00	96.0

CL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE LATERAL SHEAR FORCE AT STATION 10 (L.TONS/ FEET)

WAVE FREQ.	WAVE/SHIP LENGTH	60.00 DEGREES		75.00 DEGREES		90.00 DEGREES	
		AMPLITUDE	PHASE	AMPLITUDE	PHASE	AMPLITUDE	PHASE
.2000	5.7398	1.1931E+00	-49.8	1.1343E+00	-65.5	1.1259E+00	-82.3
.2500	3.6735	2.2373E+00	-33.3	2.0857E+00	-51.2	2.1404E+00	-87.7
.3000	2.5510	4.7497E+00	-28.6	3.0225E+00	-58.0	2.3452E+00	-93.2
.3500	1.8742	7.0816E+00	-28.5	4.0118E+00	-46.1	2.6648E+00	-91.6
.4000	1.4349	1.1220E+01	-22.3	5.8234E+00	-35.1	2.8354E+00	-89.6
.4500	1.1338	1.7814E+01	-19.2	8.6548E+00	-27.0	2.7254E+00	-86.2
.5000	.9184	2.7400E+01	-18.3	1.2766E+01	-22.7	2.2855E+00	-78.9
.5500	.7590	4.0414E+01	-19.0	1.8371E+01	-20.0	1.6147E+00	-61.0
.6000	.6378	5.6959E+01	-20.5	2.5540E+01	-19.7	1.2744E+00	-8.5
.6500	.5434	7.6518E+01	-22.4	3.4342E+01	-20.8	2.1457E+00	37.4
.7000	.4686	9.7658E+01	-24.5	4.4537E+01	-22.9	3.6502E+00	51.0
.7500	.4082	1.1797E+02	-26.5	5.5929E+01	-25.6	5.1829E+00	59.2
.8000	.3587	1.3424E+02	-28.2	6.7963E+01	-28.6	6.7579E+00	63.8
.8500	.3178	1.4312E+02	-29.7	7.9889E+01	-31.9	8.1256E+00	67.8
.9000	.2834	1.4203E+02	-30.9	9.0949E+01	-35.1	9.6706E+00	71.4
.9500	.2544	1.3018E+02	-31.9	1.0002E+02	-38.1	1.1363E+01	74.7
1.0000	.2296	1.0920E+02	-33.1	1.0604E+02	-40.9	1.2920E+01	76.8
1.0500	.2082	8.3033E+01	-35.3	1.0749E+02	-43.3	1.4584E+01	79.0
1.1000	.1897	5.7313E+01	-40.2	1.0409E+02	-45.3	1.6183E+01	81.0
1.1500	.1736	3.6584E+01	-51.4	9.5293E+01	-46.8	1.7644E+01	82.8
1.2000	.1594	2.5165E+01	-70.2	8.1298E+01	-47.7	1.8862E+01	84.5
1.2500	.1469	2.0741E+01	-81.3	6.3058E+01	-47.8	1.9762E+01	86.2
1.3000	.1359	1.6450E+01	-79.7	4.2302E+01	-47.0	2.0236E+01	87.7
1.3500	.1260	1.4740E+01	-79.2	2.1161E+01	-44.4	2.0234E+01	89.0
1.4000	.1171	1.2881E+01	-78.5	2.3616E+00	-12.3	1.9897E+01	90.7
1.4500	.1092	1.0872E+01	-77.5	1.3063E+01	129.8	1.8980E+01	92.2
1.5000	.1020	8.7175E+00	-75.9	2.2256E+01	135.0	1.7613E+01	93.9
1.5500	.0956	6.4243E+00	-73.1	2.5185E+01	139.1	1.5858E+01	95.6
1.6000	.0897	4.0196E+00	-66.4	2.2386E+01	143.1	1.3796E+01	97.5
1.6500	.0843	1.7076E+00	-38.8	1.5386E+01	146.8	1.1573E+01	99.9
1.7000	.0794	1.9877E+00	58.6	6.4601E+00	146.4	9.3144E+00	103.0
1.7500	.0750	2.7665E+00	56.2	2.4148E+00	15.3	7.1629E+00	107.0
1.8000	.0709	3.1938E+00	59.8	7.9545E+00	2.3	5.2409E+00	112.9

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE LATERAL SHEAR FORCE AT STATION 10 (L.TONS/ FEET)

				W A V E A N G L E			
		105.00 DEGREES		120.00 DEGREES		135.00 DEGREES	
WAVE	WAVE/SHIP	AMPLITUDE	PHASE	AMPLITUDE	PHASE	AMPLITUDE	PHASE
FREQ.	LENGTH						
.2000	5.7398	1.1794E+00	-94.4	1.2487E+00	-101.0	1.2182E+00	-108.3
.2500	3.6735	2.0212E+00	-112.4	1.8942E+00	-122.2	1.6092E+00	-125.6
.3000	2.5510	2.4941E+00	-117.5	2.5411E+00	-126.3	2.2385E+00	-127.6
.3500	1.8742	3.1207E+00	-124.0	3.4653E+00	-132.3	3.3473E+00	-133.5
.4000	1.4349	3.8366E+00	-132.8	4.9120E+00	-139.5	5.4831E+00	-141.5
.4500	1.1338	4.7583E+00	-143.0	7.4152E+00	-147.3	9.4456E+00	-151.0
.5000	.9184	6.1940E+00	-152.7	1.1472E+01	-154.2	1.5918E+01	-158.7
.5500	.7590	8.1834E+00	-160.5	1.7427E+01	-158.6	2.4582E+01	-164.2
.6000	.6378	1.0869E+01	-163.9	2.4892E+01	-161.8	3.5858E+01	-168.0
.6500	.5434	1.4169E+01	-164.2	3.4579E+01	-164.5	4.9030E+01	-170.1
.7000	.4686	1.7674E+01	-163.3	4.6470E+01	-166.6	6.1518E+01	-170.5
.7500	.4082	2.1768E+01	-162.4	5.9771E+01	-167.7	6.9785E+01	-169.5
.8000	.3587	2.6735E+01	-162.1	7.2633E+01	-167.9	7.0704E+01	-167.5
.8500	.3178	3.2379E+01	-161.9	8.2372E+01	-167.4	6.3181E+01	-164.6
.9000	.2834	3.8546E+01	-161.7	8.6440E+01	-166.4	4.9327E+01	-159.7
.9500	.2544	4.5042E+01	-161.4	8.2909E+01	-165.2	3.4190E+01	-150.1
1.0000	.2296	5.1042E+01	-161.1	7.1541E+01	-163.6	2.4142E+01	-131.2
1.0500	.2082	5.5871E+01	-160.7	5.4385E+01	-161.0	2.2031E+01	-111.8
1.1000	.1897	5.8578E+01	-160.4	3.5371E+01	-155.0	2.2813E+01	-106.3
1.1500	.1736	5.8324E+01	-160.3	1.9755E+01	-137.8	2.1594E+01	-110.8
1.2000	.1594	5.4610E+01	-160.7	1.3487E+01	-100.7	1.7320E+01	-118.9
1.2500	.1469	4.7363E+01	-161.7	1.4154E+01	-79.1	1.0960E+01	-121.1
1.3000	.1359	3.7055E+01	-163.8	1.3429E+01	-82.7	6.0139E+00	-95.6
1.3500	.1260	2.4757E+01	-168.3	1.0451E+01	-103.4	6.3100E+00	-62.3
1.4000	.1171	1.2195E+01	179.0	7.4697E+00	-141.5	6.3253E+00	-69.2
1.4500	.1092	4.5002E+00	100.7	5.9003E+00	168.3	4.0422E+00	-102.1
1.5000	.1020	1.0919E+01	39.3	5.1859E+00	115.8	1.6516E+00	-145.9
1.5500	.0956	1.6284E+01	27.2	3.0925E+00	67.7	1.3342E+00	47.4
1.6000	.0897	1.7759E+01	19.9	4.7260E+00	36.1	2.0396E+00	-2.1
1.6500	.0843	1.5605E+01	13.7	1.8031E+00	-20.0	1.8144E+00	-76.6
1.7000	.0794	1.0779E+01	6.8	1.8384E+00	-156.7	1.6432E+00	-158.3
1.7500	.0750	4.7905E+00	-3.1	3.4445E+00	155.7	1.9532E+00	123.5
1.8000	.0709	9.7428E-01	-151.8	3.8032E+00	115.3	1.0073E+00	40.1

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

REGULAR WAVE LATERAL SHEAR FORCE AT STATION 10 (L.TONS/ FEET)

WAVE		150.00 DEGREES		WAVE ANGLE		165.00 DEGREES	
FREQ.	WAVE/SHIP LENGTH	AMPLITUDE	PHASE	AMPLITUDE	PHASE	AMPLITUDE	PHASE
.2000	5.7398	9.3396E-01	-116.2	4.8888E-01	-120.7		
.2500	3.6735	1.1672E+00	-126.4	6.1072E-01	-126.3		
.3000	2.5510	1.6959E+00	-128.1	9.1300E-01	-127.6		
.3500	1.8742	2.7429E+00	-134.0	1.5739E+00	-134.7		
.4000	1.4349	5.0051E+00	-144.5	3.0713E+00	-147.0		
.4500	1.1338	9.3074E+00	-155.6	5.8218E+00	-158.4		
.5000	.9184	1.5720E+01	-163.1	9.8019E+00	-166.3		
.5500	.7590	2.4273E+01	-168.7	1.4857E+01	-170.8		
.6000	.6378	3.4278E+01	-171.4	2.0109E+01	-172.4		
.6500	.5434	4.3338E+01	-171.7	2.3671E+01	-171.6		
.7000	.4686	4.8183E+01	-170.2	2.3822E+01	-168.7		
.7500	.4082	4.6422E+01	-167.3	2.0343E+01	-164.0		
.8000	.3587	3.8454E+01	-162.4	1.4983E+01	-155.2		
.8500	.3178	2.7874E+01	-153.4	1.0877E+01	-138.4		
.9000	.2834	2.0177E+01	-136.4	1.0097E+01	-120.0		
.9500	.2544	1.8599E+01	-117.9	1.0983E+01	-113.0		
1.0000	.2296	1.9891E+01	-111.3	1.0854E+01	-113.9		
1.0500	.2082	1.9401E+01	-113.1	9.0143E+00	-114.2		
1.1000	.1897	1.6004E+01	-115.7	6.6547E+00	-103.7		
1.1500	.1736	1.1242E+01	-108.6	5.8063E+00	-82.9		
1.2000	.1594	8.8718E+00	-85.4	5.6701E+00	-76.3		
1.2500	.1469	8.8734E+00	-73.6	4.5546E+00	-81.1		
1.3000	.1359	7.4939E+00	-80.4	6.3666E+01	136.0		
1.3500	.1260	4.7430E+00	-87.7	2.2886E+00	-34.4		
1.4000	.1171	2.7273E+00	-45.3	2.2078E+00	-43.3		
1.4500	.1092	3.2746E+00	-31.6	1.1464E+00	-71.9		
1.5000	.1020	2.4398E+00	-62.0	5.3381E-01	70.6		
1.5500	.0956	7.2900E-01	-132.5	7.9713E-01	46.4		
1.6000	.0897	1.5607E+00	84.6	5.3288E-01	-78.6		
1.6500	.0843	1.2286E+00	2.7	1.9809E+00	169.3		
1.7000	.0794	1.1188E+00	-72.2	1.7536E+00	-174.9		
1.7500	.0750	2.9613E+00	166.3	2.8316E+00	25.5		
1.8000	.0709	7.4192E-01	-124.2	1.4802E+01	-16.9		

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

SHORT TERM LATERAL SHEAR FORCE AT STATION 10 (L.TONS)

WAVE HT. (FEET)	ROOT MEAN SQUARE	BROADNESS EPS	PER HOUR
2.380	2.9486E+01	.73990	951.7
4.879	5.8749E+01	.73684	931.4
7.334	8.1608E+01	.73297	901.2
10.497	1.1678E+02	.73297	901.2
13.867	1.4407E+02	.73139	884.8
17.894	1.9110E+02	.73192	890.8
23.554	2.3099E+02	.73063	874.2
28.835	2.6243E+02	.73010	863.1
37.139	2.8541E+02	.72996	844.8
47.602	3.5268E+02	.73005	841.7

LONG TERM RESULTS FOR INDIVIDUAL WAVE HEIGHT GROUPS

WAVE HT. (FEET)	WIDE BAND CORR.	HIGHEST OCCURANCE IN			
		8.0 HRS	24.0 HRS	48.0 HRS	72.0 HRS
2.380	.8522	1.1506E+02	1.2250E+02	1.2688E+02	1.2943E+02
4.879	.8535	2.2877E+02	2.4357E+02	2.5224E+02	2.5729E+02
7.334	.8552	3.1792E+02	3.3855E+02	3.5062E+02	3.5768E+02
10.497	.8552	4.5495E+02	4.8446E+02	5.0174E+02	5.1184E+02
13.867	.8559	5.6267E+02	5.9928E+02	6.2082E+02	6.3342E+02
17.894	.8557	7.4551E+02	7.9395E+02	8.2240E+02	8.3904E+02
23.554	.8562	9.0463E+02	9.6383E+02	9.9846E+02	1.0187E+03
28.835	.8564	1.0316E+03	1.0995E+03	1.1391E+03	1.1622E+03
37.139	.8565	1.1312E+03	1.2057E+03	1.2503E+03	1.2758E+03
47.602	.8565	1.4001E+03	1.4924E+03	1.5479E+03	1.5794E+03

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

TWO PARAMETER ISSC

SHORT CRESTED SEAS- 90.0 DEG - COS** 2.0

LONG TERM LATERAL SHEAR FORCE AT STATION 10 (L.TONS)

RESPONSE VALUE	PROBABILITY OF EXCEEDENCE	-LOG OF PROBABILITY	NUMBER IN LIFE	HISTOGRAM
0.	1.0000E+00	0.00	1.0000E+08	0.
1.2609E+02	2.0827E-01	.68	2.0827E+07	7.9173E+07
2.5219E+02	3.6234E-02	1.44	3.6234E+06	1.7204E+07
3.7828E+02	8.1669E-03	2.09	8.1669E+05	2.8067E+06
5.0437E+02	2.0133E-03	2.70	2.0133E+05	6.1535E+05
6.3047E+02	4.6297E-04	3.33	4.6297E+04	1.5504E+05
7.5656E+02	9.1845E-05	4.04	9.1845E+03	3.7112E+04
8.8265E+02	1.5551E-05	4.81	1.5551E+03	7.6295E+03
1.0087E+03	2.2936E-06	5.64	2.2936E+02	1.3257E+03
1.1348E+03	3.1187E-07	6.51	3.1187E+01	1.9817E+02
1.2609E+03	4.3531E-08	7.36	4.3531E+00	2.6834E+01
1.3870E+03	6.9494E-09	8.16	6.9494E-01	3.6582E+00
1.5131E+03	1.2531E-09	8.90	1.2531E-01	5.6962E-01
1.6392E+03	2.2921E-10	9.64	2.2921E-02	1.0239E-01
1.7653E+03	3.9133E-11	10.41	3.9133E-03	1.9008E-02
1.8914E+03	6.0153E-12	11.22	6.0153E-04	3.3117E-03
2.0175E+03	8.2258E-13	12.08	8.2258E-05	5.1927E-04
2.1436E+03	9.9708E-14	13.00	9.9708E-06	7.2287E-05
2.2697E+03	1.0701E-14	13.97	1.0701E-06	8.9007E-06
2.3958E+03	1.0165E-15	14.99	1.0165E-07	9.6845E-07
2.5219E+03	8.5438E-17	16.07	8.5438E-09	9.3104E-08
2.6480E+03	6.3537E-18	17.20	6.3537E-10	7.9085E-09
2.7741E+03	4.1796E-19	18.38	4.1796E-11	5.9357E-10
2.9001E+03	2.4318E-20	19.61	2.4318E-12	3.9365E-11
3.0262E+03	1.2512E-21	20.90	1.2512E-13	2.3067E-12
3.1523E+03	5.6914E-23	22.24	5.6914E-15	1.1943E-13
3.2784E+03	2.2886E-24	23.64	2.2886E-16	5.4626E-15
3.4045E+03	8.1339E-26	25.09	8.1339E-18	2.2073E-16
3.5306E+03	2.5546E-27	26.59	2.5546E-19	7.8785E-18
3.6567E+03	7.0891E-29	28.15	7.0891E-21	2.4837E-19
3.7828E+03	1.7379E-30	29.76	1.7379E-22	6.9153E-21

INTERPOLATED VALUES

MAXIMUM VALUE IN 10** 4 CYCLES = 7.4993E+02 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 5 CYCLES = 9.1174E+02 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 6 CYCLES = 1.0612E+03 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 7 CYCLES = 1.2077E+03 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 8 CYCLES = 1.3620E+03 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 9 CYCLES = 1.5299E+03 (AMPLITUDE)
 MAXIMUM VALUE IN 10**10 CYCLES = 1.6984E+03 (AMPLITUDE)

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APPENDIX B

EXPLANATION OF RESULTS

This appendix will briefly describe the meaning and significance of the results generated by program SCOMOT. The program capabilities and limitations will be explained in the following sections.

1. Response Amplitude Operators

The six basic responses calculated by program SCOTMOT are vertical plane motions of heave, pitch and surge and lateral plane motions of sway, yaw and roll. The results are expressed in complex notation, for instance, heave, δ_1 ,

$$\delta_1 = \delta_{1R} + i\delta_{1I}$$

or as an amplitude and phase

$$\delta_1 = \delta_{1_0} e^{-i\epsilon_1} = \delta_{1_0} \sin \epsilon_1 + i\delta_{1_0} \cos \epsilon_1$$

$$\text{where } \delta_{1_0} = \sqrt{\delta_{1R}^2 + \delta_{1I}^2}$$

$$\text{and } \epsilon = \arctan (\delta_{1R} / \delta_{1I})$$

The phase angle, ϵ_1 , represents the heave motion lead with respect to the wave elevation and δ_{1_0} is the amplitude of the sinusoidal oscillation with a frequency of encounter, ω_e . Therefore, the equation for heave displacement is expressed as follows:

$$\delta_1 = \delta_{1_0} e^{-i(\omega_e t + \epsilon_1)}$$

For heave velocity and acceleration two successive differentiations with respect to t produce:

$$\dot{\delta}_1 = \delta_{1_0} \omega_e e^{-i(\omega_e t + \epsilon_1)} = -i\omega_e \delta_1$$

$$\ddot{\delta}_1 = -\delta_{1_0} i\omega_e^2 e^{-i(\omega_e t + \epsilon_1)} = -\omega_e^2 \delta_1$$

The expressions for the other five primary motions, δ_i for $i = 2$ to 6, are identical to that just described for heave.

Three motions, in the vertical, lateral, and longitudinal, plane directions can be calculated for any input coordinate point x_p, y_p, z_p , measured from the forward perpendicular, the center-line and baseline respectively. These distances are transformed to the center of gravity therefore

$$x = XCG - x_p$$

$$y = y_p$$

$$z = KG - z_p$$

The vertical, lateral and longitudinal point displacements, $\delta_7, \delta_8, \delta_9$ respectively are given as follows:

$$\delta_7 = \delta_1 - x\delta_2 + y\delta_6$$

$$\delta_8 = \delta_4 + x\delta_5 - z\delta_6$$

$$\delta_9 = \delta_3 + z\delta_2 + y\delta_5$$

Where δ_1 to δ_6 are heave, pitch, surge, sway, yaw and roll displacements. Differentiating each of these components with respect to time will result in point velocities and accelerations.

In order to determine relative motion at any point, that is displacement, velocity and acceleration, the wave motion must be calculated at a specific point and subtracted from the point motion illustrated above. The vertical wave motions in complex form are as follows:

$$\eta = Aie^{-i(-kxcos\beta + kysin\beta + \omega t)}$$

$$\dot{\eta} = A\omega e^{-i(-kxcos\beta + kysin\beta + \omega t)} = -i\omega\eta$$

$$\ddot{\eta} = -A\omega^2 e^{-i(-kxcos\beta + kysin\beta + \omega t)} = -\omega^2\eta$$

for displacement, velocity and acceleration respectively, where A is the wave amplitude, ω the wave frequency, k the wave number and β the wave angle.

The vertical relative motion for displacement, velocity and acceleration are:

$$\begin{aligned}\delta_{10} &= \delta_7 - \eta \\ \dot{\delta}_{10} &= \dot{\delta}_7 - \dot{\eta} = -i\omega_e \delta_7 + i\omega \eta \\ \ddot{\delta}_{10} &= \ddot{\delta}_7 - \ddot{\eta} = -\omega_e^2 \delta_7 + \omega^2 \eta\end{aligned}$$

These relative motions are used to calculate shipping of water, slamming and racing of the propeller statistics which are described in a later section.

The final RAO's calculated by SCOMOT are torsion and vertical and lateral bending moments and shear forces. These are explained in II.A of the main body of this report.

The six primary motions and forces and moments, calculated by SCOMOT for a range of ship speeds, wave headings, and wave frequency are written to a file, RAOname, specified in Data Set 1. This is performed for the first execution of SCOMOT and is controlled by option control F of Data Set 3. For subsequent runs of SCOMOT, providing that the ship characteristics remain unchanged, the calculation of these primary motions can be skipped and any response discussed previously can be printed out and studied. This capability is again controlled by option control tag F of Data Set 3.

The choice of RAO's is specified in Data Set 23, the Response Control Card. Each card, selects a response type, IZ, which can range from 1 to 23 for heave, pitch, etc. The next entry on this card, IMOT, controls the motion type; displacement, velocity or acceleration for any motion other than the moments and shear forces. The next entry, IR, enables the user to print the RAO's as a function of wave heading and frequency. The RAO's can be plotted with the frequency as the abscissa and response as ordinate if the plot option, IPLRAO, is greater than zero. If IPLRAO is equal to 1, RAO's for every wave heading is plotted, if 2, every other wave heading is plotted, etc. An example of this is shown in figure B1. You must contact your UCS salesman to arrange for plotting and its delivery.

2. Wave Spectra

The wave spectra used in determining the short term responses can be analytical of Betschneider type, measured such as INDIA, PAPA, KILO, Great Lakes or a FNOC forecast or hindcast spectra from their SOWM wave model as discussed in the body of this report. The printing of the mean wave spectrum and the spectral properties is controlled by option E of Data Set 3. These printed characteristics for the mean spectra of each group are summarized here for convenience:

 $H_{1/3}$

significant wave height = $4\sqrt{m_0}$

 $T(1)$

mean average period = $2\pi m_0/m_1$

T(-1)	energy average period = $2\pi(m_{-1}/m_0)$
T(2)	zero-crossing period = $2\pi\sqrt{m_0/m_2}$
T(4)	average apparent period = $2\pi\sqrt{(m_2/m_4)}$
HC(1/3)	$H_{1/3} \times \sqrt{1 - \frac{1}{2}\epsilon^2}$
Skewness	$m_3/m_2^{3/2}$
ϵ	$\sqrt{1 - m_2^2/m_0 m_4}$ - spectral width parameter (broadness)
Flatness	m_4/m_2^2
ω_0	peak spectral frequency
$H_{1/3}/\lambda_0$	wave slope

$m(-1)$
 m_0
 m_1
 m_2
 m_3
 m_4

$$m_n = \int_0^n \omega^n S_{\zeta}(\omega) \cdot d\omega$$

3. Short Term Responses

The response spectrum is created by the linear superposition of the RAO's squared with the energy wave spectrum. The properties of this curve, area, m_0 and first moment through fourth moments m_1 to m_4 are calculated for each wave heading as follows:

$$m_n(\theta) = \int_0^\infty \text{RAO}(\omega, \theta)^2 S_\zeta(\omega) \omega^n d\omega \quad \text{for } n = 0 \text{ to } 4$$

These properties combined with the appropriate spreading function will give the short crested moments that are used to calculate the root mean square (RMS) response, the spectral width parameter (broadness) and cycles per hour for any wave heading as follows:

$$\text{RMS} = \sqrt{m_0}$$

$$\epsilon = \sqrt{1 - \frac{m_2^2}{m_0 m_4}} \quad - \text{ broadness}$$

$$\begin{aligned} \text{Cycles per hour} &= 7200/T_2 \\ &= 7200/(2\pi \sqrt{m_0/m_2}) \end{aligned}$$

where 7200 zero crossings (3600 cycles) per hour.

Quite often a spectra family with more than one spectra within a wave height band (group) is used to describe a certain sea condition. In these cases the mean RMS_a , and the standard deviation are as follows:

$$\begin{aligned} \text{RMS}_a &= \frac{1}{N} \sum_{i=1}^N \text{RMS}_i \\ \sigma &= \left[\frac{1}{N} \sum_{i=1}^N \text{RMS}_i^2 - \text{RMS}_a^2 \right]^{1/2} \end{aligned}$$

The new moments used to calculate the broadness and cycles per hour are the average values of the N spectra within that wave height group.

These short term results are performed for the response choosen by IZ on Data Set 23 providing that either the IS or IL options on the same card are greater than zero. If IS is specified to be 1, a detailed printout of each wave height group showing the RMS, standard deviation, broadness and cycles per hour for each wave heading is given. If IS is set equal to 2, a summary printout showing the averages for each group is given using the probability of headings specified in Option control tag N of Data Set 3. The short term responses as a function of wave height and wave direction can be plotted if the IPLSHT variable of Data Set 23 is greater than zero. Again, if it is equal to 1 every wave heading is plotted, to 2 every other wave heading is plotted, etc. and an example can be seen in Figure B2.

These short term calculations for relative motion and relative velocity are needed to determine the slamming, shipping of water or racing of the propeller statistics. Given the coordinate point, the RAO vertical relative displacement and velocity can be generated as previously explained. These RAO's are used to determine RMS values for different wave angles and wave height groups. The statistics are defined as the probability of exceeding a threshold value and the number of exceedances over a certain time period. These as given by Ochi can be written as follows:

$$\text{Pr \{slam impact\}} = e^{-\left(\frac{H^2}{R_{r1}} + \frac{r_*^2}{R_{\dot{r}1}}\right)}$$

where

H = ship draft at location considered

r_* = threshold relative velocity, $0.093 \sqrt{g L}$

$R_{r'}$ = twice variance of the relative motion

$R_{\dot{r}'}$ = twice variance of the relative velocity

g = acceleration of gravity

L = ship length

The variances of relative motion and velocity in the above equation are equal to the areas under the spectral density functions of relative motion and velocity, respectively, at the desired location.

The number of impacts in T hours can be written as follows:

$$N(T) = 3600 \frac{T}{2\pi} \sqrt{\frac{R_{\dot{r}1}}{R_{r1}}} \cdot \text{Pr (slam impact)}$$

In a similar manner the shipping of water statistics are as follows:

$$\text{Pr \{shipping of water\}} = e^{-\frac{F^2}{R_{r1}}}$$

where F = freeboard at location considered and the number of exceedances in T hours is

$$N(T) = 3600 \frac{T}{2\pi} \sqrt{\frac{R_{\dot{r}1}}{R_{r1}}} \cdot \text{Pr (slam impact)}$$

the propeller racing is as follows:

$$\text{Pr \{propeller racing\}} = e^{-\frac{B^2}{R_{r1}}}$$

where B = clearance between the tip of the propeller blade and the water surface

The number of occurrences in T hours is:

$$N(T) = \frac{T}{2\pi} \sqrt{\frac{R_f^2}{R_r^2}} \cdot \text{Pr (propeller racing)}$$

These statistics are calculated when input option tag I on Data Set 3 is set equal to 1 with additional input from Data Set 11. In addition, slamming and shipping of water can be calculated at any location given in Data Set 12 if IZ of Data Set 23 is defined as 23. If more than one input point is defined in Data Set 12, then the use of variables J1, J2 and JINC in Data Set 23 enables the user to selective run the slamming and shipping of water statistics only for the points of interest.

4. Long Term Responses

The long term responses are executed if variable IL on Data Set 23 is defined to 1. Two tables of long term responses are produced. The first is the highest response expected during a time period defined in Data Set 22 for each height group shown in Figure B3 while the second is a combined distribution including the combined effect of all wave heights as shown in Figure B4. In order to run the combined long term response, the probability of each wave height group must be defined as explained in Data Set 20.

The wide band correction factor is defined as

$$= \sqrt{1 - \frac{1}{2} \epsilon^2}$$

and is a correction that Ochi has introduced into the long term statistics to account for processes which are not narrow banded, (ϵ large). This number is included in the long term statistics since this correction is used by the ABS to calculate its bending moment.

The long term vertical bending moment at Station 10 shown in Figure B4 is given with its corresponding probability of exceedance. The negative log of the probability is a convenient representation of the probability level. The highest response in 10^8 cycles would correspond to 8 in this column. The number in life corresponds to the number of occurrences of the specified response value assuming 10^8 cycles in a lifetime. The histogram represents the total number of occurrences above the specified response value, i.e., there are 10 occurrences of 1.0921×10^8 ft-tons or larger in the ships lifetime.

The bending moment at midships for the SL-7 seen in Figure B4 can be compared with that generated using the 1979 ABS rules.

From these rules:

$$M_w = C_2 L^2 B H_e K_b$$

$$K_B = 1.4 - 0.5 C_B = 1.125$$

$$C_2 = (6.53 C_B + 0.57) 10^{-4} = 4.1615 \times 10^{-4}$$

$$L = 880.5 \text{ ft}$$

$$B = 105.5 \text{ ft}$$

$$C_B = .55$$

$$H_e = 4.50L - 0.00216 L^2 + 335 \quad 10^{-2} = 59.7186 \text{ ft}$$

therefore the wave induced bending moment is

$$M_w = 2.28677 \times 10^6 \text{ ft-tons}$$

yet the bending moment calculated for 10^8 cycles from the program SCOMOT is

$$M_w = 1.1942 \times 10^6 \text{ ft-tons}$$

This large discrepancy is caused by utilizing an ISSC spectra with a single spectrum in each wave height group rather than wave families employed by ABS. Consequently, the standard deviation of the response is zero and a small long term value will result.

In order to compare "apples to apples" the H Family or Station INDIA Family must be used with Program SCOMOT to determine the long term wave induced bending moment for comparison to ABS rules.

SHIP MOTION PROGRAM VER. (12/79)
SL-7 FULL LOAD EXAMPLE

DATE OF RUN - 2/25/81

TIME OF RUN - 12:22:29
SHIP SPEED = 10.000 KNOTS

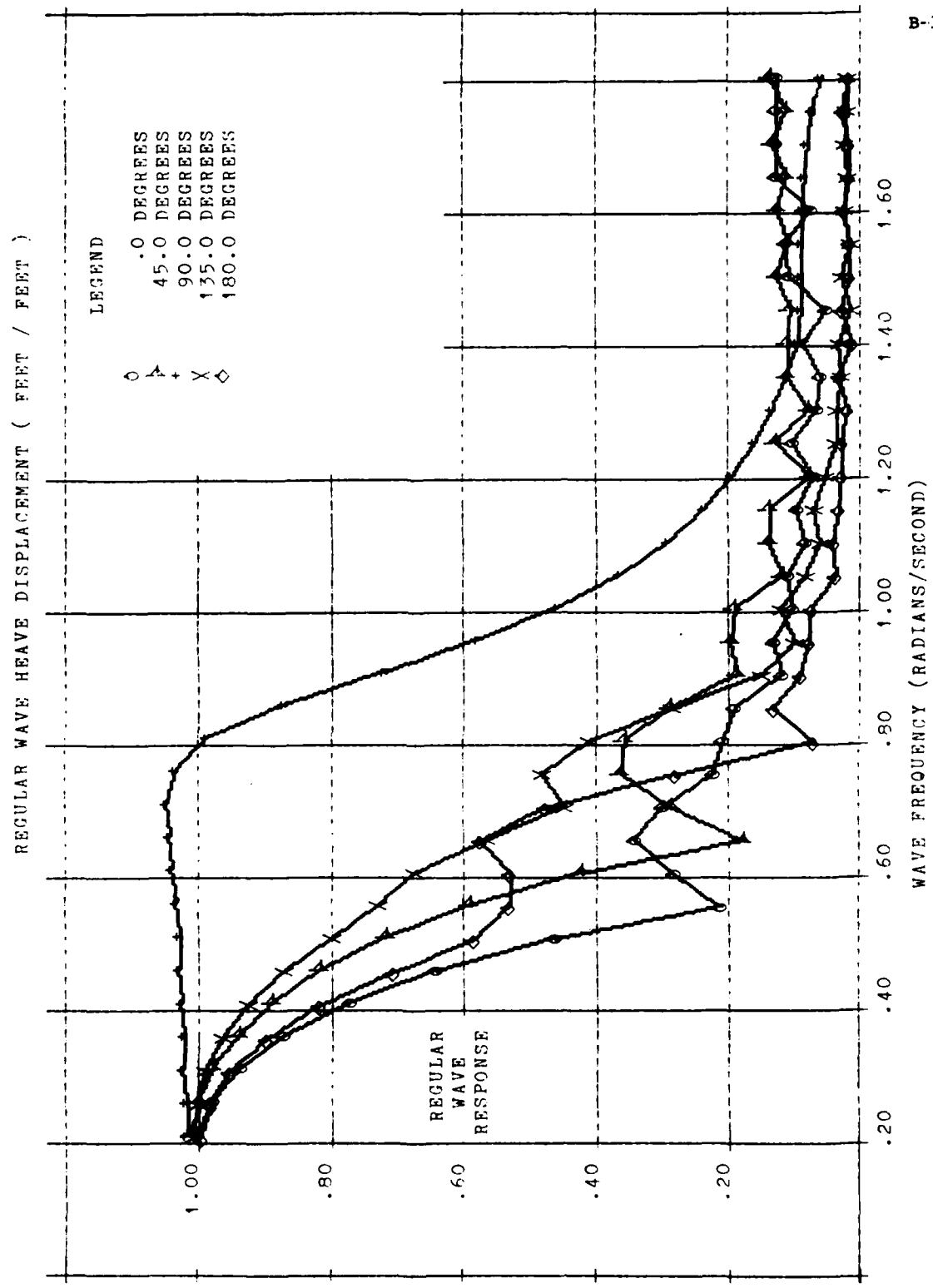


Figure B1 - Response Amplitude Operators for Heave

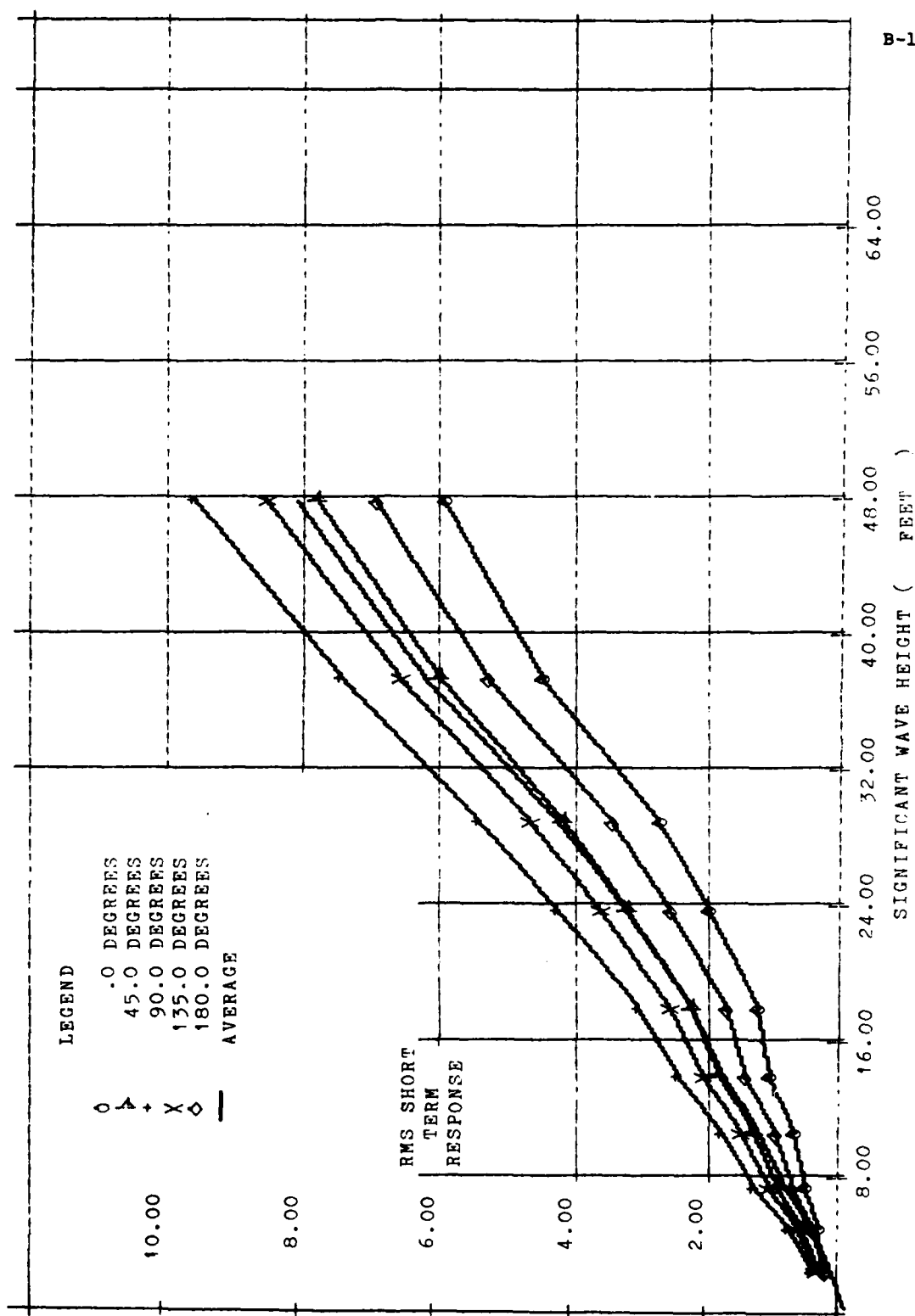
SHIP MOTION PROGRAM VER. (12/79)
SL-7 FULL LOAD EXAMPLE

DATE OF RUN - 2/25/81

TIME OF RUN - 12:22:29
SHIP SPEED - 10.000 KNOTS
SHORT CRESTED SEAS

TWO PARAMETER ISSC +/- 90.0 DEGREES COS**2.0 SPREADING FUNCTION

SHORT TERM HEAVE DISPLACEMENT (FEET)



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Figure B2 - Short Term Responses for Heave

SHIP MOTION PROGRAM 77.1

02/24/81

05.42.15

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SL-7 - NORMAL FULL LOAD DEPARTURE

DRAFT = 21.000 KNITS

TWO PARAMETER 1000

SHORT CRESTED SEAS- 80.0 DEG - COS** 2.1

SHORT TERM VERTICAL BENDING MOMENT AT STATION 10 (FEET -L.TONS)

WAVE HT. FEET	ROOT MEAN CORR.	REMAINING WLS	PER HOUR
2.380	1.0796E+04	.67580	785.7
4.879	2.4155E+04	.60751	760.0
7.374	4.0494E+04	.64047	722.7
10.427	5.7066E+04	.64047	722.6
13.867	7.9721E+04	.62967	702.0
17.894	1.0159E+05	.63700	709.6
23.554	1.3774E+05	.62120	688.5
28.875	1.6854E+05	.61525	674.0
37.173	2.0847E+05	.60628	649.0
47.602	2.6330E+05	.60508	644.6

LONG TERM RESULTS FOR INDIVIDUAL WAVE HEIGHT GROUPS

WAVE HT. FEET	WIDE BAND CORR.	HIGHEST OCCURANCE IN			
		8.0 HRS	24.0 HRS	48.0 HRS	72.0 HRS
2.380	.8777	4.0817E+04	4.3501E+04	4.5169E+04	4.6080E+04
4.879	.8837	9.5249E+04	1.0187E+05	1.0588E+05	1.0821E+05
7.374	.8916	1.7126E+05	1.8380E+05	1.9126E+05	1.9562E+05
10.427	.8916	2.4518E+05	2.6314E+05	2.7782E+05	2.8006E+05
13.867	.8957	3.4941E+05	3.7545E+05	3.9083E+05	3.9982E+05
17.894	.8942	4.7971E+05	4.7228E+05	4.9157E+05	5.0285E+05
23.554	.8981	6.1491E+05	6.6117E+05	6.8835E+05	7.0426E+05
28.875	.9004	7.6900E+05	8.2732E+05	8.6147E+05	8.8141E+05
37.173	.9034	9.7601E+05	1.0508E+06	1.0945E+06	1.1200E+06
47.602	.9039	1.2773E+06	1.3322E+06	1.3877E+06	1.4201E+06

Figure B3 - Short and Long Term by Wave Height Results for SL-7

SL-7 - NORMAL FULL LOAD DEPARTURE

SPEED = 25.000 KNOTS

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TWO PARAMETER ISSF

SHORT CRESTED SEAS- 30.0 DEG - COS** 2.0

LONG TERM VERTICAL BENDING MOMENT AT STATION 10 (FEET -L.TONS)

RESPONSE VALUE	PROBABILITY OF EXCEEDENCE	-LOG OF PROBABILITY	NUMBER IN LIFE	HISTOGRAM
0.	1.0000E-00	0.00	1.0000E+00	0.
1.2135E+05	5.5747E-02	1.25	5.5747E+01	9.4425E+07
2.4270E+05	6.8449E-03	2.16	6.8449E+02	4.8902E+07
3.6404E+05	1.1575E-03	2.94	1.1575E+03	3.4875E+05
4.8539E+05	1.9497E-04	3.71	1.9497E+04	2.0002E+04
6.0674E+05	3.0055E-05	4.52	3.0055E+05	1.6480E+04
7.2809E+05	4.4252E-06	5.35	4.4252E+05	1.1079E+03
8.4944E+05	6.9825E-07	6.16	6.9825E+05	7.7270E+02
9.7079E+05	1.3648E-07	6.86	1.3648E+06	5.4175E+01
1.0921E+06	3.2745E-08	7.49	3.2745E+06	1.0417E+01
1.2135E+06	6.0071E-09	8.10	6.0071E+06	2.4738E+00
1.3348E+06	1.8799E-09	8.73	1.8799E+06	6.1272E-01
1.4562E+06	4.0291E-10	9.39	4.0291E+06	1.4770E-01
1.5775E+06	7.7611E-11	10.11	7.7611E+06	3.2530E-02
1.6989E+06	1.3334E-11	10.88	1.3334E+07	6.4277E-03
1.8202E+06	2.0355E-12	11.69	2.0355E+07	1.1299E-03
1.9416E+06	2.7554E-13	12.56	2.7554E+07	1.7600E-04
2.0629E+06	3.3041E-14	13.48	3.3041E+07	2.4250E-05
2.1843E+06	3.5077E-15	14.45	3.5077E+07	2.9533E-06
2.3056E+06	3.2958E-16	15.48	3.2958E+08	3.1782E-07
2.4270E+06	2.7399E-17	16.56	2.7399E+09	3.0218E-08
2.5483E+06	2.0151E-18	17.70	2.0151E+10	2.5364E-09
2.6697E+06	1.3111E-19	18.88	1.3111E+11	1.8840E-10
2.7910E+06	7.5470E-21	20.12	7.5470E+12	1.2357E-11
2.9124E+06	3.8474E-22	21.40	3.8474E+13	7.1627E-13
3.0337E+06	1.7319E-23	22.76	1.7319E+14	3.6703E-14
3.1551E+06	6.9057E-25	24.16	6.9057E+15	1.6828E-15
3.2764E+06	2.4368E-26	25.61	2.4368E+16	6.6620E-17
3.3977E+06	7.6096E-28	27.12	7.6096E+17	2.3607E-18
3.5191E+06	2.1030E-29	28.66	2.1030E+18	7.3993E-20
3.6404E+06	5.1431E-31	30.29	5.1431E+19	2.0516E-21

INTERPOLATED VALUES

MAXIMUM VALUE IN 10** 4 CYCLES = 5.2870E+05 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 5 CYCLES = 6.7645E+05 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 6 CYCLES = 8.2583E+05 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 7 CYCLES = 9.9700E+05 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 8 CYCLES = 1.1942E+06 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 9 CYCLES = 1.3846E+06 (AMPLITUDE)
 MAXIMUM VALUE IN 10** 10 CYCLES = 1.5589E+06 (AMPLITUDE)

Figure B4 - Combined Long Term Results for SL-7

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APPENDIX C

JOB CONTROL FILES

07/31/80. 15.41.52.

LIST OF COMSMOT

00100 JOB,CM20000,L05,T200.
00110 ACCOUNT,U707008,██████
00120 GET,SCOMOT.
00130 RFL,200000.
00140 UNIFORE(-BATCH,LN=SMOTCOM,I=SCOMOT)
00150 PUT,LGO=SMOTBIN.
00160 GET,ZETASFO/LIB.
00170 LDSET(LIB=ZETASFO)
00180 LGO.
00190 PUT,TAPE99=PLOTOUT.
00200 PUT,OUTPUT=RESULT1.
00210 PUT,SMOTCOM.
00220 PUT,DAY1.
00230 DFD,DAY1,R.
00240 EXIT.
00250 NOEXIT.
00260 PUT,OUTPUT=RESULT1.
00270 PUT,TAPE99=PLOTOUT.
00280 PUT,SMOTCOM.
00290 PUT,DAY1.
00300 DFD,DAY1,R.
00310 EOR.
00320 SDMSL7
00330 EOF.

TABLE 1.

07/31/80. 15.40.27.
LIST OF RUNSMOT

00100 JOB, CM20000, L05, T200.
00110 ACCOUNT, U707008, [REDACTED].
00120 GET, LGO=SMOTBIN.
00130 RFL, 200000.
00140 GET, ZFTASFC/LIB.
00150 LDSET(LIB=ZETASFO)
00160 LGO.
00170 PUT, TAPE99=PLOTOUT.
00180 PUT, OUTPUT=RESULT1.
00190 PUT, DAY1.
00200 DFD, DAY1, R.
00210 EXIT.
00220 NOEXIT.
00230 PUT, OUTPUT=RESULT1.
00240 PUT, TAPE99=PLOTOUT.
00250 PUT, DAY1.
00260 DFD, DAY1, R.
00270 EOR.
00280 SDMSL7
00290 EOF.

TABLE 2.

TABLE 3

APPENDIX D

TWO DIMENSIONAL PROPERTIES FILE

PROGRAM TDPREAD(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE1)

THIS PROGRAM READS THE TWO DIMENSIONAL PROPERTIES (TDP)
FILE CREATED BY PROGRAM "STATIC" AND READ BY PROGRAM
"SCOMOT"

THE VARIABLE DEFINITION IS AS FOLLOWS:

XOFF(J) = DISTANCE OF STATION J FROM F.P.
NOFF(J) = NUMBER OF OFFSET PAIRS ON STATION J
YOFF(I,J) = DISTANCE FROM C.L. FOR OFFSET I, STATION J
ZOFF(I,J) = DISTANCE FROM B.L. FOR OFFSET I, STATION J
NWET(J) = NUMBER OF WETTED OFFSET PAIRS ON STATION J
YWET(I,J) = DISTANCE FROM C.L. FOR OFFSET I, STATION J
ZWET(I,J) = DISTANCE FROM W.L. FOR OFFSET I, STATION J
TDP(K,L,J) = TWO-DIMENSION HYDRODYNAMIC COEFFICIENT L, FOR
FREQUENCY K AND STATION J

COMMON/GEO/XOFF(21),NOFF(21),YOFF(29,21),ZOFF(29,21),
& NWET(21),YWET(21,21),ZWET(21,21),TDP(25,10,21)
DIMENSION Z2(21),Y2(21),SNE(20),CSE(20),DEL(20),TDPIN(25,10)
WRITE(6,900)
READ(5,800)TDPNAM
III=-1
CALL DFUR(4HGETR,1,TDPNAM,0,0,III)
NSTA = 21
DO 40 J = 1,NSTA
READ(1)XOFF(J),NON,(ZOFF(I,J),YOFF(I,J),I=1,NON)
NOFF(J) = NON
READ(1)NONP1,DFT,Y2,Z2,SNE,CSE,DEL
WRITE(6,910)J,XOFF(J),NON,DFT
READ(1) TDPIN
NONP1 = NON + 1
NWET(J) = NONP1
DO 20 I = 1,NONP1
YWET(I,J) = Y2(I)
ZWET(I,J) = Z2(I)
20 CONTINUE
40 STOP
800 FORMAT(A7)
900 FORMAT(5X,22HENTER TDP FILE NAME ?)
910 FORMAT(15,F10.4,15,F10.4)
END

APPENDIX E

RESULTS FROM PROGRAM STATIC

PROGRAM STATIC (05/79)

07/28/80

20.21.08

PAGE 1

ORIG.OFFSETS TABLE (FEET)

SEA-LAND 7 CONTAINERSHIP

LENGTH = 880.500

BEAM = 105.500

DEPTH = 64.305

STATION 1

21 POINTS

X = 0.000

STATION 2

21 POINTS

X = 11.006

STATION 3

21 POINTS

X = 22.013

HEIGHT Z	H-B Y	HEIGHT Z	H-B Y	HEIGHT Z	H-B Y
1	0.000	0.000	1	0.000	0.000
2	.820	3.035	2	.820	3.180
3	1.640	4.480	3	1.640	4.625
4	3.281	6.070	4	3.281	6.214
5	4.921	6.648	5	4.921	6.995
6	6.562	7.024	6	6.562	7.226
7	8.202	7.082	7	8.202	7.226
8	9.842	6.735	8	9.842	6.995
9	11.483	6.214	9	11.483	6.590
10	13.123	5.492	10	13.123	5.839
11	16.404	3.815	11	16.404	4.278
12	19.685	2.341	12	19.685	2.890
13	22.966	1.156	13	22.966	1.792
14	26.247	.289	14	26.247	1.156
15	29.528	0.000	15	29.528	.867
16	32.808	0.000	16	32.808	1.098
17	39.370	1.012	17	39.370	2.023
18	45.932	2.515	18	45.932	3.613
19	52.493	4.278	19	52.493	5.839
20	59.055	6.272	20	59.055	8.382
21	65.125	8.238	21	65.026	10.897

STATION 4

21 POINTS

X = 44.025

STATION 5

21 POINTS

X = 66.037

STATION 6

21 POINTS

X = 88.050

HEIGHT Z	H-B Y	HEIGHT Z	H-B Y	HEIGHT Z	H-B Y
1	0.000	0.000	1	0.000	0.000
2	.820	3.757	2	.820	4.191
3	1.640	5.203	3	1.640	5.578
4	3.281	6.879	4	3.281	7.399
5	4.921	7.660	5	4.921	8.527
6	6.562	8.151	6	6.562	8.671
7	8.202	8.238	7	8.202	8.902
8	9.842	8.093	8	9.842	8.816
9	11.483	7.804	9	11.483	8.527
10	13.123	7.226	10	13.123	8.093
11	16.404	5.839	11	16.404	6.648
12	19.685	4.336	12	19.685	5.347
13	22.966	3.180	13	22.966	4.393
14	26.247	2.601	14	26.247	4.133
15	29.528	2.544	15	29.528	4.336
16	32.808	3.035	16	32.808	5.000
17	39.370	5.058	17	39.370	7.602
18	45.932	7.862	18	45.932	10.984
19	52.493	11.273	19	52.493	11.909
20	59.055	14.886	20	59.055	18.788
21	64.961	18.007	21	64.895	22.545

ORIG.OFFSETS TABLE (FEET)

SEA-LAND 7 CONTAINERSHIP

LENGTH = 880.500

BEAM = 105.500

DEPTH = 64.305

STATION 7

21 POINTS

X = 110.062

STATION 8

22 POINTS

X = 132.075

STATION 9

22 POINTS

X = 176.100

STATION 7			STATION 8			STATION 9		
21 POINTS			22 POINTS			22 POINTS		
X = 110.062			X = 132.075			X = 176.100		
HEIGHT Z	H-B Y		HEIGHT Z	H-B Y		HEIGHT Z	H-B Y	
1	0.000	0.000	1	0.000	0.000	1	0.000	0.000
2	.820	5.145	2	.066	2.890	2	.131	4.336
3	1.640	6.879	3	.820	5.925	3	.820	6.937
4	3.281	8.469	4	1.640	7.226	4	1.640	8.758
5	4.921	9.294	5	3.281	8.960	5	3.281	10.695
6	6.562	9.827	6	4.921	10.059	6	4.921	11.909
7	8.202	10.261	7	6.562	10.666	7	6.562	12.862
8	9.842	10.406	8	8.202	10.952	8	8.202	13.585
9	11.483	10.203	9	9.842	11.273	9	9.842	14.308
10	13.123	10.059	10	11.483	11.330	10	11.483	14.741
11	16.404	9.394	11	13.123	11.273	11	13.123	15.319
12	19.685	8.758	12	16.404	11.128	12	16.404	16.331
13	22.966	8.613	13	19.685	11.041	13	19.685	17.342
14	26.247	9.018	14	22.966	11.330	14	22.966	18.354
15	29.528	9.827	15	26.247	12.140	15	26.247	19.741
16	32.808	11.041	16	29.528	13.151	16	29.528	21.042
17	39.370	14.452	17	32.808	14.597	17	32.808	22.487
18	45.932	18.267	18	39.370	18.094	18	39.370	25.783
19	52.493	22.545	19	45.932	22.112	19	45.932	29.482
20	59.055	27.112	20	52.493	26.303	20	52.493	33.529
21	64.698	31.303	21	59.055	30.927	21	59.055	37.864
			22	64.633	34.974	22	64.534	41.911

ORIG.OFFSETS TABLE (FEET)

SEA-LAND 7 CONTAINERSHIP

LENGTH = 880.500

BEAM = 105.500

DEPTH = 64.305

STATION 10

22 POINTS

X = 220.125

STATION 11

22 POINTS

X = 264.150

STATION 12

22 POINTS

X = 308.175

HEIGHT Z	H-B Y	HEIGHT Z	H-B Y	HEIGHT Z	H-B Y
1	0.000	0.000	1	0.000	0.000
2	.197	4.336	2	.262	7.226
3	.820	8.960	3	.820	12.284
4	1.640	10.839	4	1.640	14.741
5	3.281	13.296	5	3.281	18.210
6	4.921	15.319	6	4.921	20.666
7	6.562	16.967	7	6.562	22.776
8	8.202	18.152	8	8.202	24.279
9	9.842	19.366	9	9.842	25.667
10	11.483	20.233	10	11.483	26.736
11	13.123	21.158	11	13.123	27.893
12	16.404	23.037	12	16.404	30.003
13	19.685	24.568	13	19.685	31.794
14	22.966	26.014	14	22.966	33.297
15	26.247	27.459	15	26.247	34.830
16	29.528	28.904	16	29.528	36.188
17	32.808	30.349	17	32.808	37.633
18	39.370	33.297	18	39.370	40.177
19	45.932	36.708	19	45.932	42.720
20	52.493	40.119	20	52.493	45.380
21	59.055	43.790	21	59.055	48.183
22	64.370	46.969	22	64.337	50.351

ORIG.OFFSETS TABLE (FEET)

SEA-LAND 7 CONTAINERSHIP

LENGTH = 880.500

BEAM = 105.500

DEPTH = 64.305

STATION 13

22 POINTS

X = 352.200

STATION 14

22 POINTS

X = 396.225

STATION 15

18 POINTS

X = 440.250

HEIGHT Z	H-B Y	HEIGHT Z	H-B Y	HEIGHT Z	H-B Y
1	0.000	0.000	1	0.000	0.000
2	.394	19.366	2	.591	26.303
3	.820	23.412	3	.820	30.060
4	1.640	27.314	4	1.640	33.962
5	3.281	31.505	5	3.281	38.298
6	4.921	33.962	6	4.921	40.610
7	6.562	36.564	7	6.562	42.778
8	8.202	38.298	8	8.202	44.310
9	9.842	39.888	9	9.842	45.524
10	11.483	41.044	10	11.483	46.478
11	13.123	42.142	11	13.123	47.345
12	16.404	43.934	12	16.404	48.703
13	19.685	45.235	13	19.685	49.715
14	22.966	46.247	14	22.966	50.351
15	26.247	47.171	15	26.247	50.929
16	29.528	47.836	16	29.528	51.305
17	32.808	48.559	17	32.808	51.594
18	39.370	49.715	18	39.370	52.027
19	45.932	50.640	19	45.932	52.374
20	52.493	51.565	20	52.493	52.605
21	59.055	52.259	21	59.055	52.750
22	64.305	52.548	22	64.305	52.750

STATION 16

15 POINTS

X = 484.275

STATION 17

15 POINTS

X = 528.300

STATION 18

17 POINTS

X = 572.325

HEIGHT Z	H-B Y	HEIGHT Z	H-B Y	HEIGHT Z	H-B Y
1	0.000	0.000	1	0.000	0.000
2	.656	32.751	2	.656	32.751
3	.820	35.650	3	.820	33.911
4	1.640	40.867	4	1.640	38.548
5	3.281	44.635	5	3.281	42.751
6	4.921	46.953	6	4.921	45.359
7	6.562	48.692	7	6.562	47.185
8	8.202	49.910	8	8.202	48.692
9	9.842	50.721	9	9.842	49.649
10	11.483	51.446	10	11.483	50.489
11	13.123	52.025	11	13.123	51.214
12	16.404	52.518	12	16.404	52.083
13	19.685	52.750	13	19.685	52.605
14	22.966	52.750	14	22.966	52.750
15	68.242	52.750	15	68.242	52.750
				16	29.528
				17	68.242

ORIG.OFFSETS TABLE (FEET)

SEA-LAND 7 CONTAINERSHIP

LENGTH = 880.500

BEAM = 105.500

DEPTH = 64.305

STATION 19

18 POINTS

X = 616.350

STATION 20

21 POINTS

X = 660.375

STATION 21

21 POINTS

X = 704.400

HEIGHT Z	H-B Y	HEIGHT Z	H-B Y	HEIGHT Z	H-B Y
1	0.000	0.000	1	0.000	0.000
2	.328	15.941	2	0.000	3.188
3	.820	20.868	3	.820	11.593
4	1.640	26.085	4	1.640	16.028
5	3.281	31.592	5	3.281	22.317
6	4.921	35.505	6	4.921	27.201
7	6.562	38.548	7	6.562	31.302
8	8.202	41.070	8	8.202	34.229
9	9.842	42.954	9	9.842	36.867
10	11.483	44.780	10	11.483	39.041
11	13.123	46.142	11	13.123	40.925
12	16.404	48.547	12	16.404	44.113
13	19.685	50.141	13	19.685	46.634
14	22.966	51.243	14	22.966	48.402
15	26.247	51.938	15	26.247	49.707
16	29.528	52.460	16	29.528	50.750
17	32.808	52.750	17	32.808	51.620
18	68.242	52.750	18	39.370	52.199
			19	45.932	52.750
			20	52.493	52.750
			21	68.242	52.750

STATION 22

22 POINTS

X = 748.425

STATION 23

22 POINTS

X = 770.437

STATION 24

22 POINTS

X = 792.450

HEIGHT Z	H-B Y	HEIGHT Z	H-B Y	HEIGHT Z	H-B Y
1	0.000	0.000	1	0.000	0.000
2	0.000	2.464	2	0.000	2.174
3	.820	3.246	3	.820	2.609
4	1.640	4.290	4	1.640	3.188
5	3.281	6.724	5	3.281	4.637
6	4.921	9.420	6	4.921	6.521
7	6.562	12.376	7	6.562	8.840
8	8.202	14.985	8	8.202	10.869
9	9.842	17.970	9	9.842	13.274
10	11.483	20.288	10	11.483	15.245
11	13.123	22.781	11	13.123	17.622
12	16.404	27.100	12	16.404	21.767
13	19.685	30.925	13	19.685	25.592
14	22.966	34.200	14	22.966	28.984
15	26.247	37.099	15	26.247	32.288
16	29.528	39.562	16	29.528	35.128
17	32.808	41.823	17	32.808	37.679
18	39.370	45.504	18	39.370	42.171
19	45.932	48.692	19	45.932	45.504
20	52.493	51.301	20	52.493	48.692
21	54.626	52.025	21	54.626	51.359
22	68.242	52.025	22	68.242	52.025

ORIG.OFFSETS TABLE (FEET)

SEA-LAND 7 CONTAINERSHIP

LENGTH = 880.500

BEAM = 105.500

DEPTH = 64.305

STATION 25

22 POINTS

X = 814.463

STATION 26

15 POINTS

X = 836.475

STATION 27

12 POINTS

X = 858.487

HEIGHT Z	H-B Y	HEIGHT Z	H-B Y	HEIGHT Z	H-B Y
1	0.000	0.000	1	11.024	0.000
2	0.000	1.594	2	11.024	3.072
3	.820	1.739	3	11.483	3.623
4	1.640	1.971	4	13.123	4.492
5	3.281	2.522	5	16.404	6.376
6	4.921	3.130	6	19.685	8.840
7	6.562	4.000	7	22.966	11.535
8	8.202	4.782	8	26.247	14.955
9	9.842	5.884	9	29.528	18.549
10	11.483	6.956	10	32.808	22.317
11	13.123	8.289	11	39.370	29.042
12	16.404	11.159	12	45.932	34.780
13	19.685	14.318	13	52.493	36.693
14	22.966	17.535	14	54.626	41.475
15	26.247	21.013	15	68.635	41.475
16	29.528	24.491			
17	32.808	28.027			
18	39.370	33.911			
19	45.932	39.273			
20	52.493	44.055			
21	54.626	45.301			
22	68.537	45.301			

STATION 28

10 POINTS

X = 869.494

STATION 29

9 POINTS

X = 880.500

STATION 30

7 POINTS

X = 902.513

HEIGHT Z	H-B Y	HEIGHT Z	H-B Y	HEIGHT Z	H-B Y
1	22.966	0.000	1	26.247	0.000
2	22.966	2.753	2	26.247	2.058
3	26.247	5.507	3	29.528	5.652
4	29.528	8.898	4	32.808	9.391
5	32.808	12.956	5	39.370	17.390
6	39.370	20.607	6	45.932	24.346
7	45.932	27.303	7	52.493	30.375
8	52.493	33.012	8	54.626	32.085
9	54.626	34.780	9	68.898	32.085
10	68.898	34.780			

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ORIG.OFFSETS TABLE (FEET)

SEA-LAND 7 CONTAINERSHIP

LENGTH = 880.500

BEAM = 105.500

DEPTH = 64.305

AFTER PROFILE

	HEIGHT Z	DIST X
1	0.000	814.463
2	11.024	836.475
3	16.404	858.487
4	22.966	869.494
5	26.247	880.500
6	30.512	902.513
7	68.898	902.513

FORWARD PROFILE

	HEIGHT Z	DIST X
1	0.000	0.000
2	68.898	0.000

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WEIGHT BLOCK DATA

SL-7 - NORMAL FULL LOAD DEPARTURE

WEIGHT TYPE	BLOCK WEIGHT (L.TONS)	BLOCK LCG (FEET)	FWD END BLOCK (FEET)	AFT END BLOCK (FEET)
1	765.20	19.00	-20.00	42.00
1	1847.70	84.32	42.00	115.25
1	1205.70	143.18	115.25	167.75
1	1613.40	185.52	167.75	207.75
1	1943.60	225.50	207.75	247.75
1	2379.20	265.54	247.75	287.75
1	2305.60	305.53	287.75	327.75
1	2610.80	345.53	327.75	367.75
1	3148.70	385.52	367.75	407.75
1	3343.70	425.51	407.75	447.75
1	3299.00	467.99	447.75	492.75
1	3179.20	512.99	492.75	537.75
1	3293.30	550.00	537.75	562.75
1	3039.80	587.50	562.75	612.75
1	2661.30	635.00	612.75	652.75
1	2898.70	674.35	652.75	697.75
1	2116.10	716.10	697.75	737.75
1	1678.30	756.40	737.75	777.75
1	1597.20	795.55	777.75	817.75
1	1244.50	835.50	817.75	852.50
1	897.70	869.50	852.50	880.50
1	691.30	900.50	880.50	920.50

BLOCK TYPE	SUMMARY WEIGHT (L.TONS)	SUMMARY LCG (FEET)
1	47760.00	478.86
TOTAL	47760.00	478.86

BALANCING OF SHIP

SL-7 - NORMAL FULL LOAD DEPARTURE

6 ITERATIONS TO BALANCE SHIP

TRIM (+ BOW UP)	=	.3685	FEET
HEEL (+ ST'BD. DOWN)	=	0.0000	DEGREES
DRAFT FOWARD	=	32.5905	FEET
DRAFT AFT	=	32.9590	FEET
WEIGHT	=	47760.0000	L.TONS
BUOYANCY	=	47760.0009	L.TONS
LCG (FROM F.P.)	=	478.8632	FEET
LCB (FROM F.P.)	=	478.8730	FEET
VCG (FROM B.L.)	=	42.3100	FEET
VCB (FROM B.L.)	=	18.2237	FEET
HCG (FROM C.L.)	=	0.0000	FEET
HCB (FROM C.L.)	=	0.0000	FEET

SHEAR FORCE-BENDING MOMENT

SL-7 - NORMAL FULL LOAD DEPARTURE

DISTANCE FROM FP (FEET)	WEIGHT FORCE	BUOYANCY FORCE (L.TONS)	SHEAR FORCE	WEIGHT MOMENT	BUOYANCY MOMENT (FEET -L.TONS)	BENDING MOMENT
-20.00	0.	0.	0.0	0.	0.	0.0
42.00	7.652E+02	3.341E+02	431.1	1.760E+04	6.573E+03	11026.3
115.25	2.613E+03	1.306E+03	1306.9	1.308E+05	6.286E+04	67937.7
167.75	3.819E+03	2.499E+03	1320.1	2.976E+05	1.604E+05	137245.7
207.75	5.432E+03	3.810E+03	1622.2	4.862E+05	2.852E+05	201004.8
247.75	7.376E+03	5.531E+03	1844.4	7.467E+05	4.706E+05	276150.1
287.75	9.755E+03	7.695E+03	2059.7	1.095E+06	7.336E+05	361003.9
327.75	1.206E+04	1.031E+04	1745.5	1.536E+06	1.092E+06	443706.9
367.75	1.467E+04	1.336E+04	1314.0	2.076E+06	1.564E+06	512003.2
407.75	1.782E+04	1.674E+04	1078.2	2.733E+06	2.165E+06	567887.8
447.75	2.116E+04	2.036E+04	798.8	3.520E+06	2.907E+06	613574.3
492.75	2.446E+04	2.456E+04	-95.1	4.555E+06	3.917E+06	637055.1
537.75	2.764E+04	2.873E+04	-1092.0	5.734E+06	5.117E+06	617298.1
562.75	3.094E+04	3.101E+04	-75.2	6.467E+06	5.864E+06	603446.9
612.75	3.397E+04	3.539E+04	-1418.3	8.091E+06	7.525E+06	565641.1
652.75	3.664E+04	3.863E+04	-1991.5	9.497E+06	9.006E+06	490391.0
697.75	3.953E+04	4.182E+04	-2283.2	1.121E+07	1.082E+07	394648.7
737.75	4.165E+04	4.413E+04	-2478.0	1.284E+07	1.254E+07	301089.2
777.75	4.333E+04	4.588E+04	-2549.2	1.454E+07	1.434E+07	200883.5
817.75	4.493E+04	4.705E+04	-2124.0	1.631E+07	1.620E+07	109029.6
852.50	4.617E+04	4.758E+04	-1411.7	1.789E+07	1.785E+07	45847.6
880.50	4.707E+04	4.773E+04	-664.7	1.920E+07	1.918E+07	13612.7
920.50	4.776E+04	4.776E+04	-1.9	2.109E+07	2.109E+07	-23.8

HYDROSTATICS

SL-7 - NORMAL FULL LOAD DEPARTURE

STATION FROM F.P.	MEAN DRAFT (FEET)	BEAM (FEET)	AREA (FEET **2)	S.A. COEF.	VCB (FEET)	HCB (FEET)
0.0000	32.5905	0.0000	222.324	1.00000	10.3399	0.0000
44.0250	32.6084	6.0099	337.108	1.72017	13.5076	0.0000
88.0500	32.6264	15.8877	496.078	.95701	15.8027	0.0000
132.0750	32.6444	29.0487	720.049	.75932	17.6532	0.0000
176.1000	32.6624	44.8461	1042.487	.71170	18.6250	0.0000
220.1250	32.6803	60.5858	1429.605	.72204	18.8288	0.0000
264.1500	32.6983	75.1694	1854.109	.75434	18.5917	0.0000
308.1750	32.7163	87.5194	2298.414	.80271	18.2402	0.0000
352.2000	32.7343	97.0852	2705.843	.85143	17.8329	0.0000
396.2250	32.7523	103.1777	3022.527	.89442	17.5017	0.0000
440.2500	32.7702	105.4993	3226.108	.93315	17.2232	0.0000
484.2750	32.7882	105.5000	3272.334	.94599	17.1294	0.0000
528.3000	32.8062	105.5000	3233.935	.93438	17.2562	0.0000
572.3250	32.8242	105.5000	3132.758	.90465	17.5684	0.0000
616.3500	32.8421	105.5000	2942.562	.84926	18.1028	0.0000
660.3750	32.8601	103.2483	2633.081	.77609	18.8959	0.0000
704.4000	32.8781	95.5739	2183.000	.69472	19.8488	0.0000
748.4250	32.8961	83.7448	1649.810	.59887	20.9084	0.0000
792.4500	32.9141	66.9123	1089.759	.49482	22.0763	0.0000
836.4750	32.9320	44.8880	504.901	.51341	25.0462	0.0000
880.5000	32.9500	19.1267	77.319	.60306	30.3253	0.0000

VOLUME (MLD.)	1670467.8	FEET **3
DISPLACEMENT (MLD.)	47727.652	L.TONS
BLOCK COEFFICIENT (MLD.)	.548756	
HALF-AREA MIDSHIP SECTION	1613.054	FEET **2
MIDSHIP SECTION COEFFICIENT	.933146	
PRISMATIC COEFFICIENT (MLD.),	.588071	
TRIM	.369	FEET
HEEL	0.000	DEGREES
VCB (FROM B.L.)	18.235	FEET
HCB (FROM C.L.)	0.000	FEET
LCB (FROM F.P.)	478.872	FEET
BM, TRANSVERSE	26.964	FEET
BM, LONGITUDINAL	1456.275	FEET
MOMENT TO ALTER TRIM 0.1 FEET	7893.761	
L.TONS PER 0.1 FEET IMMERSION	183.086	
AREA OF WATERPLANE	64080.218	FEET **2
WATERPLANE COEFFICIENT (MLD.)	.689835	
L.C.F. FROM F.P.	500.541	FEET
CHANGE IN DISPL. FOR 1 FEET TRIM AFT	-125.366	L.TONS
WETTED SURFACE (MLD.)	99282.402	FEET **2

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*COEFFICIENT(DMAX=0.1, OUTPUT=TDPSL7F)

SL-7 - NORMAL FULL LOAD DEPARTURE
FRANK CLOSE FIT -21 POINTS

STATION 1
DRAFT = 32.590 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-32.590	1.933	.933	-32.338	.2609	.9654	-7.536
1.866	-32.086	1.919	2.765	-31.750	.3505	.9366	-8.539
3.664	-31.413	1.914	4.418	-30.825	.6153	.7883	-15.484
5.172	-30.236	1.894	5.728	-29.469	.8096	.5870	-20.497
6.284	-28.703	1.930	6.559	-27.778	.9584	.2855	-24.748
6.835	-26.853	1.925	6.948	-25.897	.9930	.1180	-24.896
7.062	-24.941	1.922	6.929	-23.990	.9904	-.1384	-24.718
6.796	-23.038	1.932	6.518	-22.113	.9577	-.2879	-23.053
6.240	-21.188	1.933	5.853	-20.302	.9164	-.4003	-20.948
5.466	-19.417	1.933	5.026	-18.556	.8905	-.4550	-18.811
4.586	-17.695	1.933	4.152	-16.832	.8933	-.4495	-16.902
3.717	-15.968	1.933	3.321	-15.087	.9122	-.4098	-15.123
2.925	-14.205	1.932	2.547	-13.316	.9201	-.3916	-13.250
2.168	-12.427	1.933	1.840	-11.518	.9405	-.3397	-11.458
1.512	-10.609	1.931	1.221	-9.688	.9535	-.3014	-9.605
.930	-8.767	1.933	.682	-7.832	.9668	-.2555	-7.747
.435	-6.898	.964	.369	-6.421	.9904	-.1379	-6.410
.303	-5.943	.964	.236	-5.466	.9904	-.1379	-5.446
.170	-4.989	.967	.127	-4.507	.9961	-.0877	-4.501
.085	-4.026	.967	.042	-3.544	.9961	-.0877	-3.534
0.000	-3.063						

SL-7 - NORMAL FULL LOAD DEPARTURE
FRANK CLOSE FIT -20 POINTS

STATION 1
DRAFT = 32.590 FEET

FREQ. PARAM.	A' 33	N' Z	M S	N S	M S.R	N S.R	I R	N R
.00	INFINITY	0.000	.715	0.000	12.90	0.00	247.4	0.0
.01	.134	-.000	.716	.000	12.92	.00	247.3	.0
.03	.134	-.000	.722	.000	13.03	.00	249.3	.0
.06	.135	.000	.732	.001	13.21	.01	252.6	.3
.10	.137	.000	.745	.003	13.45	.05	257.1	1.0
.15	.138	.001	.762	.007	13.76	.14	262.6	2.6
.21	.140	.001	.781	.016	14.09	.31	268.6	5.7
.28	.141	.003	.800	.032	14.42	.60	274.3	11.3
.36	.142	.005	.815	.058	14.67	1.07	278.4	19.9
.45	.142	.008	.821	.093	14.76	1.73	279.5	32.0
.55	.142	.011	.816	.140	14.62	2.56	276.4	47.2
.67	.140	.016	.793	.198	14.17	3.61	267.3	66.0
.82	.137	.021	.748	.266	13.30	4.80	250.8	86.9
1.01	.132	.027	.681	.333	12.04	5.93	227.3	106.2
1.25	.125	.032	.599	.383	10.57	6.72	200.6	118.4
1.55	.118	.035	.521	.404	9.19	6.96	176.3	120.3
1.95	.111	.034	.455	.395	8.06	6.62	157.4	111.3
2.45	.107	.029	.412	.358	7.39	5.81	147.1	94.4
3.05	.105	.022	.390	.307	7.12	4.78	144.2	74.6
3.80	.106	.014	.385	.248	7.13	3.67	146.1	54.5
4.70	.107	.008	.390	.191	7.32	2.68	150.7	37.6
5.80	.110	.004	.402	.141	7.59	1.85	156.1	24.5
7.10	.112	.002	.415	.100	7.86	1.24	161.2	15.5
8.70	.113	.001	.429	.068	8.11	.80	165.5	9.4
10.70	.117	0.000	.494	0.000	9.12	0.00	181.5	0.0

SL-7 - NORMAL FULL LOAD DEPARTURE
FRANK CLOSE FIT -21 POINTS

STATION 2
DRAFT = 32.608 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-32.608	2.136	1.044	-32.381	.2133	.9770	-5.886
2.087	-32.153	2.121	3.108	-31.865	.2712	.9625	-5.651
4.129	-31.578	2.119	4.988	-30.958	.5852	.8109	-14.070
5.847	-30.338	2.107	6.512	-29.520	.7759	.6309	-18.795
7.177	-28.703	2.130	7.563	-27.710	.9318	.3631	-23.073
7.950	-26.718	2.123	8.088	-25.665	.9915	.1304	-24.392
8.227	-24.613	2.133	8.135	-23.550	.9963	-.0856	-24.160
8.044	-22.488	2.130	7.799	-21.451	.9731	-.2303	-22.671
7.554	-20.415	2.135	7.166	-19.420	.9317	-.3633	-20.697
6.778	-18.426	2.136	6.362	-17.442	.9210	-.3895	-18.542
5.946	-16.458	2.136	5.505	-15.485	.9107	-.4130	-16.376
5.064	-14.512	2.135	4.635	-13.535	.9159	-.4014	-14.257
4.206	-12.557	2.136	3.851	-11.550	.9432	-.3323	-12.173
3.496	-10.542	2.129	3.235	-9.510	.9695	-.2453	-10.013
2.974	-8.478	2.136	2.789	-7.426	.9848	-.1735	-7.797
2.604	-6.374	2.136	2.584	-5.306	.9998	-.0185	-5.353
2.564	-4.238	2.129	2.626	-3.175	.9983	.0585	-3.016
2.689	-2.113	2.136	2.847	-1.056	.9890	.1481	-.623
3.005	0.000	1.502	2.254	0.000	0.0000	-1.0000	-2.254
1.502	0.000	1.502	.751	0.000	0.0000	-1.0000	-.751
0.000	0.000						

SL-7 - NORMAL FULL LOAD DEPARTURE
FRANK CLOSE FIT -20 POINTS

STATION 2
DRAFT = 32.608 FEET

FREQ. PARAM.	A' 33	N' Z	M S	N S	M S.R	N S.R	I R	N R
.00	INFINITY	0.000	1.729	0.000	24.64	0.00	383.3	0.0
.01	.170	.002	1.386	.000	20.69	.00	337.5	.0
.03	.159	.004	1.412	.000	21.07	.01	343.1	.1
.06	.151	.006	1.454	.003	21.69	.04	352.2	.6
.10	.145	.007	1.516	.010	22.58	.15	365.3	2.4
.15	.140	.007	1.596	.028	23.74	.43	382.3	6.7
.21	.137	.007	1.694	.068	25.13	1.04	402.4	16.1
.28	.135	.006	1.798	.147	26.57	2.23	422.5	34.3
.36	.135	.005	1.879	.285	27.63	4.31	436.2	65.5
.45	.135	.003	1.893	.498	27.62	7.44	433.2	111.9
.55	.136	.002	1.788	.771	25.83	11.36	403.3	168.9
.67	.138	.001	1.527	1.065	21.78	15.46	340.5	226.4
.82	.141	-.000	1.141	1.288	16.03	18.35	254.6	263.6
1.01	.143	.000	.752	1.361	10.44	18.91	174.2	265.1
1.25	.144	.002	.469	1.296	6.56	17.44	121.3	236.8
1.55	.144	.005	.307	1.158	4.55	14.96	97.2	195.0
1.95	.143	.008	.232	.989	3.86	12.07	92.8	148.7
2.45	.141	.009	.216	.822	4.03	9.34	100.5	107.0
3.05	.139	.009	.233	.673	4.62	7.01	113.1	73.7
3.80	.138	.007	.267	.539	5.40	5.07	127.2	48.0
4.70	.138	.004	.307	.429	6.19	3.60	140.0	30.4
5.80	.139	.002	.347	.341	6.91	2.54	150.8	19.0
7.10	.139	.001	.383	.273	7.49	1.83	159.0	12.2
8.70	.140	.000	.415	.220	7.97	1.34	165.4	8.1
10.70	.141	0.000	.571	0.000	9.85	0.00	188.2	0.0

SL-7 - NORMAL FULL LOAD DEPARTURE
FRANK CLOSE FIT -21 POINTS

STATION 3
DRAFT = 32.626 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-32.626	2.188	1.077	-32.435	.1746	.9846	-4.603
2.154	-32.244	2.188	3.232	-32.053	.1746	.9846	-2.415
4.309	-31.862	2.169	5.277	-31.374	.4506	.8927	-9.425
6.245	-30.885	2.188	7.075	-30.172	.6520	.7582	-14.308
7.904	-29.458	2.181	8.536	-28.569	.8152	.5792	-18.345
9.167	-27.681	2.188	9.371	-26.606	.9825	.1861	-24.397
9.575	-25.531	2.174	9.644	-24.446	.9980	.0639	-23.780
9.713	-23.361	2.183	9.532	-22.285	.9860	-.1666	-23.561
9.350	-21.209	2.187	9.090	-20.147	.9715	-.2372	-21.728
8.831	-19.084	2.188	8.509	-18.039	.9556	-.2947	-19.745
8.186	-16.993	2.188	7.864	-15.948	.9556	-.2947	-17.557
7.542	-14.902	2.188	7.225	-13.855	.9571	-.2898	-15.354
6.908	-12.809	2.188	6.672	-11.740	.9766	-.2151	-12.901
6.437	-10.672	2.175	6.326	-9.590	.9947	-.1024	-10.187
6.214	-8.508	2.187	6.220	-7.414	1.0000	.0054	-7.380
6.226	-6.321	2.188	6.444	-5.249	.9801	.1986	-3.865
6.661	-4.176	2.183	6.947	-3.123	.9651	.2620	-1.194
7.233	-2.069	2.188	7.588	-1.035	.9457	.3249	1.487
7.944	0.000	3.972	5.958	0.000	0.0000	-1.0000	-5.958
3.972	0.000	3.972	1.986	0.000	0.0000	-1.0000	-1.986
0.000	0.000						

SL-7 - NORMAL FULL LOAD DEPARTURE
FRANK CLOSE FIT -20 POINTS

STATION 3
DRAFT = 32.626 FEET

FREQ. PARAM.	A' 33	N' Z	M S	N S	M S.R	N S.R	I R	N R
.00	INFINITY	0.000	1.742	0.000	23.89	0.00	360.1	0.0
.01	.381	.016	1.581	.000	22.13	.00	340.1	.0
.03	.315	.028	1.615	.001	22.59	.01	346.4	.1
.06	.269	.038	1.671	.004	23.34	.05	356.7	.8
.10	.234	.046	1.751	.014	24.43	.20	371.4	2.9
.15	.206	.052	1.857	.041	25.84	.58	390.5	8.3
.21	.185	.055	1.982	.100	27.48	1.41	412.2	20.2
.28	.169	.056	2.104	.216	29.03	3.03	432.0	42.8
.36	.158	.054	2.175	.416	29.82	5.78	440.3	80.7
.45	.151	.050	2.123	.704	28.86	9.67	424.0	133.6
.55	.147	.046	1.899	1.030	25.56	13.97	375.7	190.5
.67	.146	.040	1.507	1.319	20.07	17.61	298.8	236.4
.82	.147	.032	1.048	1.474	13.84	19.30	214.3	253.9
1.01	.150	.025	.663	1.467	8.80	18.72	148.7	240.0
1.25	.156	.017	.416	1.351	5.77	16.68	111.9	206.9
1.55	.162	.012	.289	1.192	4.40	14.12	98.2	167.8
1.95	.168	.007	.238	1.016	4.09	11.37	99.2	127.6
2.45	.173	.005	.236	.850	4.44	8.86	108.4	92.5
3.05	.176	.004	.260	.703	5.09	6.74	120.5	64.6
3.80	.179	.003	.298	.572	5.87	4.97	133.3	42.9
4.70	.181	.004	.340	.463	6.63	3.60	144.7	27.7
5.80	.183	.005	.381	.373	7.32	2.58	154.4	17.6
7.10	.183	.006	.419	.302	7.89	1.87	161.8	11.3
8.70	.184	.006	.452	.244	8.36	1.36	167.7	7.3
10.70	.187	0.000	.624	0.000	10.27	0.00	189.0	0.0

SL-7 - NORMAL FULL LOAD DEPARTURE
CONFORMAL MAPPING - 7 COEFFICIENTS

STATION 4
DRAFT = 32.644 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-32.644	2.242	1.121	-32.619	.0227	.9997	.381
2.242	-32.594	2.231	3.339	-32.394	.1790	.9839	-2.511
4.437	-32.194	1.109	4.959	-32.007	.3373	.9414	-6.129
5.481	-31.820	1.109	6.003	-31.633	.3373	.9414	-5.020
6.525	-31.446	2.233	7.389	-30.739	.6331	.7740	-13.743
8.253	-30.033	2.229	8.960	-29.171	.7733	.6341	-16.876
9.666	-28.309	2.229	10.129	-27.295	.9097	.4153	-20.623
10.592	-26.282	2.239	10.807	-25.183	.9814	.1921	-22.637
11.022	-24.084	2.236	11.164	-22.975	.9919	.1267	-21.375
11.306	-21.866	2.241	11.291	-20.746	.9999	-.0131	-20.892
11.276	-19.625	2.242	11.227	-18.505	.9990	-.0436	-18.977
11.179	-17.385	2.242	11.139	-16.264	.9994	-.0354	-16.649
11.099	-15.144	2.242	11.073	-14.023	.9997	-.0235	-14.280
11.046	-12.902	2.242	11.145	-11.786	.9961	.0877	-10.762
11.243	-10.669	2.236	11.436	-9.567	.9850	.1727	-7.448
11.629	-8.466	2.242	11.901	-7.379	.9702	.2423	-4.276
12.173	-6.291	2.242	12.503	-5.219	.9556	.2947	-1.303
12.833	-4.148	2.239	13.227	-3.100	.9362	.3515	1.747
13.620	-2.052	2.242	14.072	-1.026	.9151	.4031	4.734
14.524	0.000						

FREQ. PARAM.	A' 33	N' Z	M S	N S	M S.R	N S.R	I R	N R
.00	INFINITY	0.000	1.668	0.000	19.69	0.00	266.1	0.0
.01	.989	.067	1.685	.000	19.87	.00	268.1	.0
.03	.727	.109	1.725	.001	20.31	.01	273.0	.1
.06	.563	.143	1.791	.005	21.04	.06	281.2	.7
.10	.447	.168	1.885	.019	22.08	.23	292.7	2.7
.15	.361	.186	2.006	.055	23.39	.65	307.1	7.6
.21	.297	.197	2.141	.135	24.82	1.56	322.2	18.2
.28	.249	.201	2.252	.286	25.92	3.28	333.0	37.8
.36	.215	.200	2.270	.529	25.91	6.00	330.6	68.3
.45	.190	.195	2.123	.844	24.03	9.43	306.8	105.8
.55	.174	.186	1.805	1.149	20.29	12.63	263.0	139.4
.67	.163	.173	1.374	1.370	15.43	14.77	208.2	159.8
.82	.159	.157	.948	1.452	10.78	15.27	157.8	161.2
1.01	.160	.138	.623	1.406	7.41	14.34	123.1	146.5
1.25	.166	.116	.422	1.285	5.50	12.59	105.7	123.4
1.55	.177	.095	.320	1.135	4.72	10.58	100.9	98.5
1.95	.190	.075	.281	.972	4.66	8.47	103.9	73.5
2.45	.204	.058	.283	.817	5.03	6.54	111.2	52.0
3.05	.219	.043	.305	.679	5.59	4.93	120.1	35.7
3.80	.230	.034	.343	.552	6.25	3.55	128.7	22.7
4.70	.239	.027	.384	.444	6.88	2.48	136.2	13.8
5.80	.246	.021	.425	.352	7.45	1.69	142.4	8.0
7.10	.251	.017	.463	.278	7.92	1.14	147.2	4.6
8.70	.256	.014	.497	.218	8.31	.75	150.9	2.5
10.70	.260	.010	.528	.166	8.63	.47	153.8	1.3

SL-7 - NORMAL FULL LOAD DEPARTURE
CONFORMAL MAPPING - 5 COEFFICIENTS

STATION 5
DRAFT = 32.662 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-32.662	2.408	1.203	-32.626	.0302	.9995	.216
2.407	-32.590	2.398	3.602	-32.499	.0754	.9972	1.142
4.798	-32.409	2.405	5.956	-32.086	.2688	.9632	-2.888
7.114	-31.762	1.195	7.641	-31.479	.4734	.8808	-8.172
8.167	-31.196	1.195	8.693	-30.914	.4734	.8808	-6.977
9.220	-30.631	2.398	10.098	-29.815	.6803	.7329	-12.881
10.977	-29.000	2.404	11.654	-28.006	.8262	.5634	-16.573
12.332	-27.013	2.404	12.870	-25.938	.8943	.4474	-17.438
13.407	-24.863	2.406	13.880	-23.757	.9197	.3927	-16.397
14.352	-22.651	2.406	14.694	-21.497	.9588	.2840	-16.438
15.036	-20.344	2.407	15.406	-19.199	.9514	.3081	-13.519
15.777	-18.054	2.408	16.132	-16.903	.9556	.2947	-11.399
16.487	-15.753	2.408	16.841	-14.602	.9556	.2947	-8.991
17.196	-13.452	2.408	17.551	-12.301	.9556	.2946	-6.584
17.906	-11.151	2.405	18.302	-10.016	.9440	.3299	-3.417
18.699	-8.881	2.408	19.168	-7.772	.9210	.3895	.308
19.637	-6.663	2.408	20.083	-5.545	.9287	.3709	2.299
20.530	-4.427	2.407	20.991	-3.315	.9237	.3832	4.982
21.452	-2.203	2.408	21.938	-1.102	.9151	.4031	7.835
22.423	0.000						

FREQ.	A'	N'	M	N	M	N	I	N
PARAM.	33	Z	S	S	S.R	S.R	R	R
.00	INFINITY	0.000	1.563	0.000	12.31	0.00	127.4	0.0
.01	2.230	.158	1.578	.000	12.42	.00	128.2	.0
.03	1.613	.255	1.616	.001	12.68	.01	130.0	.1
.06	1.234	.330	1.678	.006	13.11	.04	133.0	.3
.10	.972	.387	1.765	.021	13.70	.16	137.1	1.2
.15	.782	.427	1.871	.060	14.40	.45	141.7	3.4
.21	.642	.452	1.976	.141	15.06	1.04	145.8	7.7
.28	.538	.464	2.041	.284	15.38	2.06	147.2	14.9
.36	.460	.466	2.012	.493	15.00	3.50	143.4	24.9
.45	.404	.458	1.854	.739	13.71	5.13	133.3	35.7
.55	.365	.443	1.591	.962	11.75	6.52	119.0	44.2
.67	.338	.420	1.268	1.124	9.47	7.40	103.1	48.6
.82	.321	.389	.950	1.199	7.34	7.60	89.2	48.1
1.01	.317	.350	.694	1.188	5.74	7.18	79.6	43.3
1.25	.324	.304	.519	1.116	4.79	6.34	74.9	36.0
1.55	.340	.255	.417	1.011	4.37	5.32	74.0	27.9
1.95	.366	.204	.367	.885	4.34	4.19	75.5	19.8
2.45	.394	.158	.356	.756	4.55	3.14	78.5	13.0
3.05	.422	.121	.368	.635	4.89	2.25	81.6	7.9
3.80	.449	.090	.395	.522	5.27	1.51	84.6	4.4
4.70	.473	.063	.427	.417	5.62	.95	87.1	2.1
5.80	.492	.045	.462	.330	5.94	.56	89.0	.9
7.10	.507	.032	.495	.260	6.20	.31	90.4	.4
8.70	.520	.022	.525	.202	6.40	.15	91.4	.1
10.70	.531	.014	.553	.152	6.57	.06	92.2	.0

SL-7 - NORMAL FULL LOAD DEPARTURE
CONFORMAL MAPPING - 5 COEFFICIENTS

STATION 6
DRAFT = 32.680 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-32.680	2.686	1.342	-32.619	.0454	.9990	-.140
2.683	-32.558	2.683	4.021	-32.452	.0793	.9968	1.434
5.358	-32.346	1.343	6.023	-32.256	.1336	.9910	1.661
6.689	-32.166	1.343	7.354	-32.077	.1336	.9910	3.004
8.020	-31.987	2.662	9.286	-31.576	.3086	.9512	-.913
10.552	-31.165	2.682	11.682	-30.444	.5381	.8429	-6.533
12.812	-29.722	2.684	13.871	-28.898	.6141	.7892	-6.799
14.931	-28.074	2.684	15.899	-27.146	.6920	.7219	-7.307
16.868	-26.217	2.684	17.665	-25.138	.8043	.5942	-9.723
18.463	-24.058	2.678	19.187	-22.932	.8411	.5409	-8.908
19.912	-21.805	2.686	20.563	-20.631	.8743	.4853	-8.059
21.215	-19.457	2.686	21.882	-18.292	.8678	.4969	-4.999
22.550	-17.126	2.684	23.154	-15.928	.8928	.4504	-3.793
23.758	-14.730	2.686	24.319	-13.510	.9087	.4174	-2.127
24.879	-12.290	2.686	25.421	-11.061	.9152	.4031	.125
25.962	-9.832	2.686	26.503	-8.603	.9151	.4031	2.811
27.045	-7.374	2.686	27.586	-6.145	.9151	.4031	5.497
28.127	-4.916	2.686	28.669	-3.687	.9151	.4031	8.183
29.210	-2.458	2.686	29.752	-1.229	.9151	.4031	10.869
30.293	0.000						

FREQ. PARAM.	A' 33	N' Z	M S	N S	M S.R	N S.R	I R	N R
.00	INFINITY	0.000	1.518	0.000	3.30	0.00	25.6	0.0
.01	4.001	.290	1.535	.000	3.33	.00	25.6	.0
.03	2.868	.461	1.575	.001	3.38	.00	25.7	.0
.06	2.187	.590	1.640	.007	3.47	.01	25.8	.0
.10	1.726	.684	1.729	.026	3.59	.05	26.0	.1
.15	1.399	.747	1.830	.072	3.70	.13	26.1	.2
.21	1.162	.785	1.916	.163	3.76	.28	26.2	.5
.28	.988	.802	1.944	.313	3.70	.50	26.0	.8
.36	.862	.800	1.869	.513	3.46	.77	25.5	1.2
.45	.771	.784	1.685	.725	3.08	1.00	24.9	1.4
.55	.710	.755	1.433	.902	2.64	1.13	24.3	1.4
.67	.667	.715	1.154	1.024	2.24	1.13	23.8	1.2
.82	.644	.660	.891	1.079	1.93	.99	23.6	.9
1.01	.639	.591	.678	1.071	1.77	.75	23.7	.5
1.25	.654	.513	.529	1.015	1.74	.44	23.9	.2
1.55	.685	.429	.438	.930	1.81	.13	24.0	.0
1.95	.730	.339	.387	.822	1.96	-.18	24.6	.0
2.45	.781	.259	.373	.708	2.14	-.43	24.8	.3
3.05	.831	.193	.381	.598	2.32	-.59	24.8	.6
3.80	.877	.139	.404	.493	2.47	-.68	24.7	.9
4.70	.917	.099	.432	.399	2.59	-.69	24.6	1.2
5.80	.951	.068	.464	.318	2.68	-.64	24.5	1.3
7.10	.978	.047	.493	.251	2.73	-.56	24.3	1.3
8.70	1.000	.031	.522	.194	2.76	-.46	24.3	1.1
10.70	1.018	.020	.547	.148	2.77	-.36	24.2	.9

SL-7 - NORMAL FULL LOAD DEPARTURE
CONFORMAL MAPPING - 5 COEFFICIENTS

STATION 7
DRAFT = 32.698 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-32.698	3.033	1.516	-32.643	.0363	.9993	.330
3.031	-32.588	3.033	4.547	-32.533	.0363	.9993	3.363
6.062	-32.478	3.031	7.573	-32.355	.0815	.9967	4.911
9.083	-32.231	3.033	10.591	-32.065	.1096	.9940	7.013
12.098	-31.899	3.027	13.535	-31.424	.3139	.9495	2.989
14.972	-30.949	1.517	15.658	-30.624	.4275	.9040	1.062
16.343	-30.300	1.517	17.029	-29.976	.4275	.9040	2.578
17.714	-29.652	3.028	18.995	-28.845	.5331	.8461	.695
20.276	-28.037	3.032	21.484	-27.120	.6049	.7963	.701
22.691	-26.203	3.031	23.711	-25.083	.7394	.6732	-2.584
24.731	-23.962	3.027	25.632	-22.745	.8038	.5949	-3.036
26.532	-21.528	3.033	27.389	-20.277	.8251	.5649	-1.259
28.245	-19.026	3.033	29.066	-17.751	.8411	.5409	.793
29.886	-16.475	3.033	30.620	-15.148	.8752	.4838	1.557
31.353	-13.821	3.032	32.014	-12.457	.9000	.4358	2.740
32.674	-11.092	3.033	33.311	-9.716	.9076	.4198	5.167
33.948	-8.340	3.032	34.570	-6.957	.9119	.4105	7.847
35.193	-5.574	3.033	35.777	-4.175	.9227	.3855	9.939
36.362	-2.776	3.033	36.973	-1.388	.9151	.4031	13.636
37.585	0.000						

FREQ.	A'	N'	M	N	M	N	I	N
PARAM.	33	Z	S	S	S.R	S.R	R	R
.00	INFINITY	0.000	1.558	0.000	-5.66	0.00	28.8	0.0
.01	6.037	.444	1.577	.000	-5.74	-.00	29.1	.0
.03	4.295	.698	1.624	.002	-5.92	-.01	29.9	.0
.06	3.266	.884	1.698	.009	-6.21	-.04	31.1	.1
.10	2.583	1.014	1.797	.034	-6.61	-.13	32.6	.5
.15	2.107	1.097	1.902	.092	-7.03	-.35	34.4	1.3
.21	1.768	1.142	1.975	.202	-7.35	-.78	35.8	3.0
.28	1.526	1.155	1.966	.371	-7.36	-1.44	36.0	5.6
.36	1.353	1.142	1.841	.579	-6.92	-2.27	34.5	9.0
.45	1.235	1.109	1.617	.780	-6.07	-3.10	31.3	12.3
.55	1.157	1.059	1.351	.932	-5.05	-3.75	27.4	15.1
.67	1.108	.991	1.082	1.028	-3.98	-4.19	23.1	17.2
.82	1.087	.905	.839	1.065	-3.00	-4.42	19.2	18.4
1.01	1.094	.800	.648	1.050	-2.19	-4.44	15.7	19.0
1.25	1.128	.683	.513	.994	-1.59	-4.31	13.1	18.8
1.55	1.183	.562	.430	.912	-1.18	-4.06	11.1	18.3
1.95	1.256	.440	.385	.809	-.91	-3.71	9.7	17.2
2.45	1.334	.331	.373	.698	-.79	-3.30	8.8	15.8
3.05	1.408	.244	.383	.592	-.76	-2.87	8.3	14.2
3.80	1.477	.169	.404	.486	-.80	-2.40	8.3	11.9
4.70	1.533	.117	.433	.394	-.89	-1.97	8.5	9.9
5.80	1.581	.079	.464	.314	-1.00	-1.57	8.9	7.9
7.10	1.618	.053	.494	.248	-1.12	-1.23	9.4	6.1
8.70	1.648	.035	.522	.194	-1.25	-.93	9.9	4.5
10.70	1.674	.021	.548	.145	-1.37	-.67	10.5	3.1

SL-7 - NORMAL FULL LOAD DEPARTURE
CONFORMAL MAPPING - 5 COEFFICIENTS

STATION 8
DRAFT = 32.716 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-32.716	3.397	1.698	-32.668	.0284	.9996	.770
3.395	-32.620	3.397	5.093	-32.572	.0284	.9996	4.167
6.790	-31.524	3.397	8.488	-32.475	.0284	.9996	7.563
10.185	-32.427	3.395	11.880	-32.320	.0632	.9980	9.812
13.574	-32.213	3.397	15.266	-32.065	.0870	.9962	12.419
16.957	-31.917	1.696	17.779	-31.706	.2491	.9685	9.319
18.600	-31.494	1.696	19.422	-31.283	.2491	.9685	11.016
20.243	-31.072	3.397	21.825	-30.453	.3645	.9312	9.224
23.406	-29.834	3.383	24.889	-29.020	.4809	.8767	7.864
26.373	-28.207	3.396	27.769	-27.242	.5685	.8227	7.360
29.166	-26.276	3.393	30.432	-25.147	.6658	.7462	5.966
31.698	-24.017	3.392	32.813	-22.739	.7538	.6571	4.420
33.927	-21.460	3.390	34.953	-20.111	.7962	.6051	5.138
35.978	-18.761	3.395	36.850	-17.305	.8581	.5135	4.075
37.722	-15.848	3.395	38.473	-14.326	.8967	.4426	4.183
39.225	-12.803	3.397	39.837	-11.219	.9326	.3609	3.914
40.450	-9.636	3.397	41.039	-8.043	.9379	.3469	6.691
41.628	-6.450	3.397	42.168	-4.840	.9483	.3175	8.798
42.707	-3.229	3.397	43.233	-1.615	.9507	.3100	11.867
43.760	0.000						

FREQ. PARAM.	A' 33	N' Z	M S	N S	M S.R	N S.R	I R	N R
.00	INFINITY	0.000	1.637	0.000	-13.39	0.00	141.0	0.0
.01	8.078	.601	1.660	.000	-13.57	-.00	142.4	.0
.03	5.715	.935	1.716	.002	-14.01	-.02	146.0	.2
.06	4.338	1.171	1.805	.012	-14.71	-.10	151.5	.9
.10	3.439	1.329	1.920	.044	-15.60	-.36	158.4	3.0
.15	2.823	1.422	2.035	.118	-16.46	-.97	164.8	7.9
.21	2.393	1.464	2.098	.255	-16.86	-2.06	167.3	16.7
.28	2.092	1.463	2.049	.455	-16.35	-3.63	162.4	29.1
.36	1.885	1.427	1.866	.682	-14.79	-5.38	149.1	42.5
.45	1.750	1.365	1.591	.884	-12.53	-6.86	130.7	53.4
.55	1.669	1.283	1.296	1.024	-10.19	-7.82	112.2	59.9
.67	1.629	1.178	1.014	1.103	-8.03	-8.28	95.6	62.3
.82	1.627	1.049	.772	1.125	-6.22	-8.26	82.3	60.9
1.01	1.663	.900	.584	1.096	-4.90	-7.85	73.1	56.5
1.25	1.733	.740	.455	1.030	-4.06	-7.16	67.8	50.1
1.55	1.827	.583	.377	.939	-3.63	-6.32	65.7	42.8
1.95	1.940	.430	.338	.826	-3.51	-5.34	65.9	34.8
2.45	2.054	.304	.332	.707	-3.62	-4.38	67.7	27.4
3.05	2.154	.209	.347	.594	-3.85	-3.51	70.1	21.0
3.80	2.244	.133	.375	.479	-4.15	-2.68	72.9	15.0
4.70	2.314	.085	.409	.383	-4.46	-2.02	75.5	10.7
5.80	2.371	.053	.444	.301	-4.76	-1.49	77.9	7.4
7.10	2.415	.032	.477	.235	-5.02	-1.08	79.9	5.0
8.70	2.450	.019	.507	.181	-5.26	-.76	81.5	3.3
10.70	2.478	.011	.535	.134	-5.46	-.51	82.9	2.0

SL-7 - NORMAL FULL LOAD DEPARTURE
CONFORMAL MAPPING - 5 COEFFICIENTS

STATION 9
DRAFT = 32.734 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-32.734	3.742	1.870	-32.696	.0203	.9998	1.205
3.741	-32.658	3.742	5.611	-32.620	.0203	.9998	4.947
7.482	-32.582	3.742	9.352	-32.544	.0203	.9998	8.689
11.223	-32.506	3.742	13.093	-32.468	.0203	.9998	12.430
14.963	-32.430	3.742	16.834	-32.392	.0203	.9998	16.172
18.704	-32.354	3.740	20.567	-32.186	.0899	.9959	17.589
22.429	-32.018	3.738	24.268	-31.683	.1792	.9838	18.196
26.106	-31.348	3.730	27.878	-30.764	.3130	.9497	16.846
29.649	-30.180	1.860	30.477	-29.756	.4563	.8898	13.542
31.304	-29.331	1.860	32.132	-28.907	.4563	.8898	15.402
32.959	-28.483	3.741	34.533	-27.472	.5405	.8413	14.206
36.107	-26.461	3.731	37.486	-25.204	.6736	.7391	10.729
38.865	-23.947	3.730	40.028	-22.489	.7817	.6236	7.383
41.191	-21.031	3.738	42.154	-19.429	.8572	.5151	5.058
43.116	-17.827	3.735	43.900	-16.132	.9076	.4199	3.790
44.684	-14.438	3.739	45.291	-12.669	.9459	.3244	2.708
45.897	-10.901	3.741	46.419	-9.104	.9604	.2787	4.196
46.940	-7.308	3.740	47.343	-5.482	.9766	.2153	4.838
47.745	-3.656	3.742	48.144	-1.828	.9770	.2131	8.473
48.543	0.000						

FREQ.	A'	N'	M	N	M	N	I	N
PARAM.	33	Z	S	S	S.R	S.R	R	R
.00	INFINITY	0.000	1.748	0.000	-18.74	0.00	352.0	0.0
.01	9.917	.743	1.775	.000	-19.03	-.00	355.0	.0
.03	6.989	1.146	1.842	.003	-19.72	-.03	362.3	.4
.06	5.303	1.422	1.949	.016	-20.81	-.18	373.5	2.1
.10	4.215	1.598	2.083	.056	-22.13	-.63	386.7	7.1
.15	3.481	1.694	2.210	.149	-23.27	-1.64	396.9	18.1
.21	2.977	1.724	2.261	.316	-23.50	-3.40	396.3	36.7
.28	2.633	1.702	2.168	.550	-22.17	-5.77	378.8	60.5
.36	2.407	1.638	1.924	.801	-19.30	-8.15	346.3	83.1
.45	2.268	1.542	1.593	1.007	-15.73	-9.93	308.4	98.1
.55	2.197	1.423	1.263	1.139	-12.37	-10.86	274.8	103.7
.67	2.177	1.279	.963	1.205	-9.50	-11.04	248.0	101.3
.82	2.206	1.109	.713	1.212	-7.30	-10.59	229.5	92.7
1.01	2.280	.919	.524	1.169	-5.85	-9.65	219.4	79.9
1.25	2.393	.725	.397	1.089	-5.09	-8.41	216.4	65.1
1.55	2.530	.543	.323	.984	-4.88	-7.04	218.4	50.4
1.95	2.683	.377	.290	.858	-5.07	-5.59	223.7	36.5
2.45	2.826	.248	.292	.727	-5.50	-4.27	230.2	25.1
3.05	2.946	.158	.314	.604	-6.02	-3.17	236.4	16.8
3.80	3.046	.097	.348	.490	-6.55	-2.28	242.1	10.7
4.70	3.127	.054	.389	.379	-7.03	-1.56	246.5	6.4
5.80	3.188	.031	.430	.295	-7.44	-1.07	250.2	3.9
7.10	3.234	.018	.466	.228	-7.78	-.72	252.9	2.3
8.70	3.271	.009	.500	.171	-8.06	-.47	255.1	1.3
10.70	3.299	.005	.530	.128	-8.29	-.30	256.8	.7

SL-7 - NORMAL FULL LOAD DEPARTURE
CONFORMAL MAPPING - 3 COEFFICIENTS

STATION 10
DRAFT = 32.752 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-32.752	4.027	2.013	-32.707	.0224	.9997	1.278
4.026	-32.662	4.027	6.039	-32.617	.0224	.9997	5.305
8.052	-32.571	4.027	10.065	-32.526	.0224	.9997	9.332
12.078	-32.481	4.027	14.091	-32.436	.0224	.9997	13.359
16.104	-32.391	4.027	18.117	-32.345	.0224	.9997	17.386
20.130	-32.300	4.027	22.143	-32.255	.0224	.9997	21.413
24.156	-32.210	4.026	26.167	-32.128	.0404	.9992	24.846
28.179	-32.047	2.008	29.173	-31.908	.1383	.9904	24.479
30.168	-31.769	2.008	31.162	-31.630	.1383	.9904	26.487
32.156	-31.491	4.015	34.080	-30.916	.2868	.9580	23.780
36.003	-30.340	3.996	37.792	-29.451	.4451	.8955	20.733
39.581	-28.561	4.026	41.195	-27.359	.5973	.8020	16.699
42.810	-26.157	4.020	44.104	-24.618	.7652	.6438	9.553
45.398	-23.080	4.024	46.383	-21.326	.8719	.4897	4.121
47.369	-19.572	4.025	48.115	-17.703	.9286	.3710	1.412
48.862	-15.834	4.022	49.396	-13.895	.9641	.2656	-.274
49.930	-11.956	4.027	50.298	-9.977	.9832	.1827	-.618
50.666	-7.997	4.025	50.941	-6.003	.9907	.1363	.997
51.215	-4.009	4.027	51.402	-2.005	.9957	.0929	2.777
51.589	0.000						

FREQ.	A'	N'	M	N	M	N	I	N
PARAM.	33	Z	S	S	S.R	S.R	R	R
.00	INFINITY	0.000	1.871	0.000	-18.10	0.00	603.6	0.0
.01	11.129	.831	1.904	.000	-18.42	-.00	606.7	.0
.03	7.843	1.273	1.983	.003	-19.19	-.04	614.5	.5
.06	5.962	1.567	2.110	.019	-20.38	-.22	626.1	2.6
.10	4.760	1.745	2.270	.068	-21.77	-.77	638.5	8.6
.15	3.958	1.830	2.416	.182	-22.81	-1.97	645.1	21.3
.21	3.418	1.838	2.462	.386	-22.59	-3.99	637.2	41.2
.28	3.062	1.785	2.326	.666	-20.47	-6.52	610.2	63.9
.36	2.841	1.684	2.009	.953	-16.77	-8.78	570.7	81.1
.45	2.722	1.548	1.605	1.175	-12.68	-10.13	531.9	87.4
.55	2.681	1.389	1.221	1.305	-9.21	-10.45	503.1	83.7
.67	2.701	1.203	.885	1.357	-6.58	-9.96	485.1	73.0
.82	2.779	.995	.614	1.344	-4.88	-8.83	477.5	57.9
1.01	2.908	.775	.417	1.278	-4.09	-7.30	478.3	41.5
1.25	3.075	.564	.290	1.173	-4.03	-5.61	484.8	26.6
1.55	3.257	.382	.223	1.045	-4.48	-3.99	493.6	15.0
1.95	3.443	.232	.201	.897	-5.26	-2.49	502.9	6.8
2.45	3.605	.129	.215	.739	-6.10	-1.32	510.7	2.3
3.05	3.731	.068	.250	.600	-6.87	-.57	516.1	.5
3.80	3.830	.034	.297	.473	-7.52	-.12	520.0	.0
4.70	3.903	.016	.347	.365	-8.00	.10	522.5	.0
5.80	3.958	.007	.394	.277	-8.36	.17	524.3	.1
7.10	3.999	.003	.436	.210	-8.61	.16	525.6	.1
8.70	4.031	.002	.473	.157	-8.78	.13	526.6	.1
10.70	4.057	.001	.505	.116	-8.92	.10	527.4	.1

SL-7 - NORMAL FULL LOAD DEPARTURE
CONFORMAL MAPPING - 3 COEFFICIENTS

STATION 11
DRAFT = 32.770 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-32.770	4.235	2.117	-32.728	.0201	.9998	1.459
4.234	-32.685	4.235	6.352	-32.643	.0201	.9998	5.695
8.469	-32.600	4.235	10.586	-32.558	.0201	.9998	9.930
12.703	-32.515	4.235	14.820	-32.472	.0201	.9998	14.165
16.937	-32.430	4.235	19.055	-32.387	.0201	.9998	18.400
21.172	-32.345	4.235	23.289	-32.302	.0201	.9998	22.635
25.406	-32.260	4.235	27.523	-32.217	.0201	.9998	26.871
29.641	-32.175	4.234	31.756	-32.095	.0375	.9993	30.530
33.871	-32.016	4.232	35.961	-31.684	.1566	.9877	30.554
38.051	-31.353	2.107	39.047	-31.011	.3250	.9457	26.850
40.043	-30.668	2.107	41.040	-30.326	.3250	.9457	28.956
42.036	-29.984	4.204	43.795	-28.834	.5472	.8370	20.879
45.555	-27.683	4.231	47.025	-26.162	.7191	.6949	13.866
48.495	-24.641	4.222	49.473	-22.770	.8862	.4632	2.737
50.450	-20.900	4.230	51.107	-18.889	.9506	.3103	-2.099
51.763	-16.878	4.229	52.082	-14.788	.9885	.1510	-6.754
52.402	-12.697	4.234	52.515	-10.583	.9986	.0537	-7.747
52.629	-8.470	4.235	52.666	-6.352	.9998	.0176	-5.424
52.704	-4.235	4.235	52.727	-2.117	.9999	.0109	-1.544
52.750	0.000						

FREQ.	A'	N'	M	N	M	N	I	N
PARAM.	33	Z	S	S	S.R	S.R	R	R
.00	INFINITY	0.000	1.977	0.000	-17.07	0.00	829.5	0.0
.01	11.979	.893	2.013	.000	-17.41	-.00	832.9	.0
.03	8.441	1.362	2.102	.004	-18.25	-.05	841.3	.6
.06	6.425	1.670	2.242	.022	-19.53	-.25	853.6	3.0
.10	5.144	1.850	2.419	.077	-20.98	-.87	866.0	9.9
.15	4.296	1.927	2.577	.207	-21.94	-2.22	870.6	24.0
.21	3.733	1.922	2.615	.436	-21.40	-4.43	858.0	45.1
.28	3.369	1.849	2.443	.744	-18.74	-7.06	825.1	67.3
.36	3.152	1.726	2.075	1.050	-14.51	-9.24	781.9	81.4
.45	3.047	1.565	1.626	1.278	-10.14	-10.30	743.4	83.2
.55	3.026	1.383	1.212	1.403	-6.68	-10.26	718.2	75.1
.67	3.072	1.176	.858	1.445	-4.25	-9.39	705.4	60.9
.82	3.179	.949	.578	1.419	-2.88	-7.93	703.4	44.1
1.01	3.340	.717	.379	1.339	-2.48	-6.14	709.3	27.8
1.25	3.534	.502	.235	1.222	-2.82	-4.29	719.1	14.8
1.55	3.737	.324	.192	1.082	-3.61	-2.62	729.6	6.1
1.95	3.937	.185	.177	.916	-4.65	-1.13	739.4	1.4
2.45	4.104	.096	.198	.754	-5.67	-.16	746.1	.0
3.05	4.231	.047	.240	.606	-6.51	.38	750.3	.2
3.80	4.329	.021	.292	.473	-7.17	.60	752.9	.8
4.70	4.400	.009	.346	.364	-7.62	.60	754.5	1.0
5.80	4.454	.004	.397	.276	-7.92	.51	755.8	.9
7.10	4.493	.002	.442	.209	-8.12	.38	756.7	.7
8.70	4.524	.001	.481	.155	-8.25	.27	757.6	.5
10.70	4.549	.000	.514	.115	-8.34	.18	758.3	.3

SL-7 - NORMAL FULL LOAD DEPARTURE
CONFORMAL MAPPING - 3 COEFFICIENTS

STATION 12
DRAFT = 32.788 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-32.788	4.300	2.150	-32.745	.0200	.9998	1.493
4.299	-32.702	4.300	6.449	-32.659	.0200	.9998	5.793
8.598	-32.616	4.300	10.748	-32.573	.0200	.9998	10.093
12.897	-32.530	4.300	15.047	-32.487	.0200	.9998	14.393
17.196	-32.444	4.300	19.346	-32.401	.0200	.9998	18.693
21.495	-32.358	4.300	23.645	-32.314	.0200	.9998	22.993
25.794	-32.271	4.300	27.944	-32.228	.0200	.9998	27.293
30.093	-32.185	4.299	32.242	-32.112	.0340	.9994	31.133
34.390	-32.039	4.296	36.521	-31.768	.1264	.9920	32.211
38.651	-31.496	2.133	39.677	-31.204	.2742	.9617	29.600
40.702	-30.911	2.133	41.727	-30.619	.2742	.9617	31.733
42.753	-30.327	4.277	44.611	-29.268	.4950	.8689	24.274
46.469	-28.209	4.276	47.973	-26.689	.7109	.7033	14.766
49.477	-25.169	4.287	50.451	-23.260	.8907	.4546	2.216
51.426	-21.351	4.280	51.912	-19.267	.9738	.2272	-6.967
52.398	-17.182	4.297	52.574	-15.041	.9966	.0819	-10.686
52.750	-12.900	4.300	52.750	-10.750	1.0000	0.0000	-10.750
52.750	-8.600	4.300	52.750	-6.450	1.0000	0.0000	-6.450
52.750	-4.300	4.300	52.750	-2.150	1.0000	0.0000	-2.150
52.750	0.000						

FREQ. PARAM.	A' 33	N' Z	M S	N S	M S.R	N S.R	I R	N R
.00	INFINITY	0.000	2.017	0.000	-15.65	0.00	885.6	0.0
.01	12.109	.901	2.054	.000	-15.98	-.00	888.9	.0
.03	8.536	1.373	2.145	.004	-16.80	-.05	896.7	.5
.06	6.502	1.681	2.291	.022	-18.04	-.25	908.1	2.9
.10	5.211	1.859	2.474	.080	-19.44	-.87	919.1	9.4
.15	4.358	1.933	2.636	.214	-20.32	-2.20	922.5	22.6
.21	3.794	1.923	2.673	.452	-19.68	-4.35	909.3	42.1
.28	3.433	1.845	2.491	.771	-16.94	-6.89	877.5	61.8
.36	3.221	1.714	2.105	1.086	-12.73	-8.91	837.1	73.3
.45	3.122	1.548	1.639	1.317	-8.47	-9.79	802.8	73.0
.55	3.109	1.360	1.212	1.441	-5.19	-9.59	781.6	63.9
.67	3.163	1.148	.850	1.479	-2.98	-8.60	772.4	49.9
.82	3.280	.918	.566	1.448	-1.84	-7.06	773.0	34.2
1.01	3.450	.684	.366	1.363	-1.64	-5.24	780.3	19.8
1.25	3.651	.472	.242	1.241	-2.14	-3.41	790.5	9.1
1.55	3.859	.298	.181	1.093	-3.07	-1.74	801.0	2.8
1.95	4.060	.166	.168	.926	-4.17	-.42	809.1	.2
2.45	4.226	.084	.192	.759	-5.22	.42	814.5	.2
3.05	4.351	.039	.236	.609	-6.05	.82	817.5	1.1
3.80	4.447	.017	.291	.474	-6.67	.91	819.3	1.8
4.70	4.516	.007	.347	.364	-7.08	.81	820.4	1.8
5.80	4.568	.003	.399	.275	-7.35	.64	821.4	1.5
7.10	4.607	.001	.445	.208	-7.50	.47	822.2	1.1
8.70	4.637	.000	.485	.154	-7.60	.32	822.9	.7
10.70	4.662	.000	.518	.115	-7.67	.21	823.5	.4

SL-7 - NORMAL FULL LOAD DEPARTURE
CONFORMAL MAPPING - 3 COEFFICIENTS

STATION 13
DRAFT = 32.806 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-32.806	4.238	2.119	-32.764	.0200	.9998	1.462
4.237	-32.721	4.238	6.356	-32.679	.0200	.9998	5.700
8.475	-32.636	4.238	10.594	-32.594	.0200	.9998	9.939
12.712	-32.551	4.238	14.831	-32.509	.0200	.9998	14.177
16.950	-32.467	4.238	19.068	-32.424	.0200	.9998	18.415
21.187	-32.382	4.238	23.306	-32.339	.0200	.9998	22.653
25.425	-32.297	4.238	27.543	-32.254	.0200	.9998	26.892
29.662	-32.212	4.232	31.775	-32.101	.0526	.9986	30.042
33.888	-31.989	4.238	35.975	-31.620	.1740	.9847	29.925
38.062	-31.252	2.115	39.056	-30.890	.3422	.9396	26.126
40.049	-30.528	2.115	41.043	-30.166	.3422	.9396	28.241
42.037	-29.804	4.220	43.843	-28.714	.5166	.8562	22.704
45.649	-27.624	4.233	47.153	-26.134	.7040	.7102	15.088
48.656	-24.644	4.234	49.662	-22.781	.8798	.4753	3.558
50.668	-20.919	4.227	51.311	-18.905	.9526	.3041	-2.405
51.954	-16.892	4.233	52.288	-14.802	.9874	.1582	-6.345
52.623	-12.712	4.237	52.687	-10.594	.9996	.0299	-9.013
52.750	-8.477	4.238	52.750	-6.357	1.0000	0.0000	-6.357
52.750	-4.238	4.238	52.750	-2.119	1.0000	0.0000	-2.119
52.750	0.000						

FREQ.	A'	N'	M	N	M	N	I	N
PARAM.	33	Z	S	S	S.R	S.R	R	R
.00	INFINITY	0.000	1.974	0.000	-17.63	0.00	836.3	0.0
.01	12.040	.898	2.009	.000	-17.98	-.00	839.9	.0
.03	8.482	1.369	2.098	.004	-18.83	-.05	848.7	.6
.06	6.456	1.679	2.238	.022	-20.14	-.26	861.6	3.1
.10	5.167	1.860	2.414	.077	-21.64	-.89	874.6	10.3
.15	4.315	1.938	2.570	.206	-22.63	-2.26	879.7	25.0
.21	3.748	1.933	2.608	.434	-22.10	-4.52	866.8	47.1
.28	3.382	1.862	2.437	.740	-19.40	-7.22	832.7	70.5
.36	3.163	1.738	2.072	1.045	-15.10	-9.45	787.5	85.7
.45	3.057	1.578	1.626	1.272	-10.64	-10.57	747.0	88.0
.55	3.034	1.396	1.213	1.397	-7.09	-10.57	720.1	80.0
.67	3.078	1.189	.860	1.439	-4.58	-9.71	706.1	65.5
.82	3.185	.961	.582	1.414	-3.14	-8.25	703.4	47.9
1.01	3.345	.727	.383	1.336	-2.68	-6.45	709.0	30.8
1.25	3.539	.511	.258	1.220	-2.98	-4.57	719.0	16.8
1.55	3.742	.331	.194	1.081	-3.76	-2.86	729.9	7.3
1.95	3.943	.190	.179	.916	-4.79	-1.33	740.2	1.9
2.45	4.111	.099	.199	.754	-5.82	-.31	747.3	.1
3.05	4.240	.049	.241	.606	-6.67	.27	751.9	.1
3.80	4.338	.022	.293	.474	-7.35	.52	754.8	.6
4.70	4.410	.010	.346	.365	-7.82	.55	756.7	.8
5.80	4.465	.004	.397	.277	-8.13	.47	758.1	.8
7.10	4.505	.002	.442	.209	-8.34	.36	759.1	.6
8.70	4.536	.001	.481	.156	-8.48	.26	760.0	.4
10.70	4.561	.000	.514	.116	-8.58	.17	760.7	.3

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SL-7 - NORMAL FULL LOAD DEPARTURE
CONFORMAL MAPPING - 3 COEFFICIENTS

STATION 14
DRAFT = 32.824 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-32.824	4.115	2.057	-32.783	.0200	.9998	1.402
4.115	-32.742	4.115	6.172	-32.701	.0200	.9998	5.518
8.229	-32.660	4.115	10.287	-32.619	.0200	.9998	9.633
12.344	-32.578	4.115	14.401	-32.537	.0200	.9998	13.749
16.459	-32.495	4.115	18.516	-32.454	.0200	.9998	17.864
20.573	-32.413	4.115	22.630	-32.371	.0207	.9998	21.954
24.688	-32.328	4.115	26.738	-32.158	.0826	.9966	23.992
28.789	-31.988	4.115	30.819	-31.650	.1642	.9864	25.203
32.848	-31.312	2.054	33.832	-31.017	.2876	.9578	23.484
34.815	-30.722	2.054	35.799	-30.426	.2876	.9578	25.538
36.783	-30.131	4.098	38.651	-29.290	.4104	.9119	23.226
40.520	-28.449	4.111	42.244	-27.330	.5443	.8389	20.562
43.968	-26.212	4.107	45.442	-24.782	.6963	.7177	15.359
46.916	-23.352	4.107	48.133	-21.698	.8055	.5926	11.045
49.350	-20.043	4.110	50.197	-18.171	.9112	.4120	4.123
51.043	-16.298	4.112	51.528	-14.300	.9718	.2360	-1.737
52.014	-12.302	4.113	52.280	-10.263	.9916	.1296	-3.402
52.547	-8.224	4.113	52.641	-6.170	.9989	.0459	-3.745
52.736	-4.115	4.115	52.743	-2.058	1.0000	.0035	-1.872
52.750	0.000						

FREQ.	A'	N'	M	N	M	N	I	N
PARAM.	33	Z	S	S	S.R	S.R	R	R
.00	INFINITY	0.000	1.867	0.000	-22.11	0.00	753.1	0.0
.01	11.905	.892	1.899	.000	-22.50	-.00	757.8	.0
.03	8.377	1.364	1.980	.003	-23.44	-.05	769.3	.7
.06	6.365	1.677	2.107	.020	-24.90	-.27	786.5	3.8
.10	5.082	1.865	2.267	.070	-26.61	-.94	805.0	12.7
.15	4.229	1.954	2.408	.186	-27.85	-2.41	815.0	31.4
.21	3.656	1.963	2.445	.390	-27.56	-4.86	803.8	60.7
.28	3.279	1.907	2.301	.666	-24.98	-7.91	764.8	94.1
.36	3.044	1.800	1.982	.945	-20.56	-10.64	707.7	120.0
.45	2.918	1.656	1.585	1.159	-15.70	-12.30	651.3	130.6
.55	2.873	1.488	1.211	1.285	-11.56	-12.77	608.6	126.8
.67	2.893	1.293	.883	1.337	-8.38	-12.29	580.7	112.8
.82	2.974	1.073	.619	1.325	-6.26	-11.06	567.2	92.2
1.01	3.110	.840	.425	1.262	-5.17	-9.35	566.1	69.0
1.25	3.285	.616	.299	1.162	-4.96	-7.41	573.4	46.9
1.55	3.476	.421	.232	1.038	-5.37	-5.50	584.9	28.8
1.95	3.674	.259	.208	.892	-6.19	-3.69	598.0	15.0
2.45	3.845	.148	.220	.745	-7.15	-2.25	609.3	6.6
3.05	3.981	.080	.253	.610	-8.03	-1.24	617.9	2.4
3.80	4.087	.041	.297	.487	-8.80	-.56	624.1	.6
4.70	4.167	.019	.348	.369	-9.37	-.20	628.6	.1
5.80	4.227	.009	.396	.279	-9.82	-.02	631.6	.0
7.10	4.271	.004	.437	.211	-10.14	.04	633.8	.0
8.70	4.306	.002	.474	.158	-10.38	.06	635.5	.0
10.70	4.333	.001	.506	.117	-10.56	.05	636.8	.0

SL-7 - NORMAL FULL LOAD DEPARTURE
CONFORMAL MAPPING - 3 COEFFICIENTS

STATION 15
DRAFT = 32.842 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-32.842	3.939	1.969	-32.802	.0206	.9998	1.294
3.938	-32.761	3.939	5.907	-32.721	.0206	.9998	5.232
7.876	-32.680	3.939	9.845	-32.640	.0206	.9998	9.171
11.814	-32.599	3.939	13.782	-32.558	.0206	.9998	13.110
15.751	-32.518	3.938	17.711	-32.330	.0956	.9954	14.540
19.671	-32.141	1.969	20.646	-32.005	.1383	.9904	16.022
21.621	-31.869	1.969	22.596	-31.733	.1383	.9904	17.991
23.571	-31.597	3.931	25.496	-31.200	.2018	.9794	18.676
27.421	-30.804	3.939	29.308	-30.242	.2855	.9584	19.455
31.195	-29.679	3.937	33.019	-28.939	.3762	.9265	19.705
34.843	-28.198	3.936	36.591	-27.296	.4588	.8885	19.990
38.340	-26.393	3.932	39.967	-25.288	.5617	.8274	18.863
41.593	-24.184	3.939	43.067	-22.879	.6630	.7486	17.073
44.542	-21.573	3.933	45.781	-20.046	.7763	.6304	13.298
47.021	-18.520	3.924	48.081	-16.869	.8416	.5401	11.774
49.140	-15.217	3.931	49.903	-13.406	.9216	.3881	7.013
50.666	-11.595	3.932	51.175	-9.696	.9659	.2588	3.881
51.684	-7.797	3.938	52.024	-5.857	.9850	.1728	3.220
52.364	-3.918	3.937	52.557	-1.959	.9952	.0980	3.200
52.750	0.000						

FREQ.	A'	N'	M	N	M	N	I	N
PARAM.	33	Z	S	S	S.R	S.R	R	R
.00	INFINITY	0.000	1.706	0.000	-27.32	0.00	688.1	0.0
.01	11.652	.878	1.734	.000	-27.74	-.00	694.5	.1
.03	8.192	1.346	1.803	.003	-28.77	-.05	710.2	.8
.06	6.215	1.662	1.911	.017	-30.36	-.28	734.0	4.7
.10	4.950	1.861	2.045	.059	-32.26	-.97	761.2	15.9
.15	4.103	1.965	2.164	.156	-33.78	-2.50	780.0	40.0
.21	3.525	1.994	2.200	.326	-33.83	-5.09	773.9	79.5
.28	3.135	1.962	2.091	.556	-31.59	-8.44	732.1	128.3
.36	2.880	1.882	1.839	.795	-27.29	-11.70	661.5	172.1
.45	2.727	1.765	1.515	.988	-22.20	-14.03	583.6	199.2
.55	2.652	1.622	1.198	1.110	-17.54	-15.17	516.7	207.3
.67	2.636	1.450	.912	1.172	-13.61	-15.30	464.6	200.0
.82	2.677	1.248	.674	1.178	-10.63	-14.57	429.6	180.3
1.01	2.772	1.024	.492	1.138	-8.69	-13.17	411.6	152.5
1.25	2.912	.797	.369	1.062	-7.72	-11.34	408.1	121.1
1.55	3.077	.585	.297	.961	-7.52	-9.33	414.5	90.5
1.95	3.261	.395	.264	.839	-7.88	-7.22	427.3	62.1
2.45	3.431	.251	.265	.710	-8.58	-5.32	442.2	39.7
3.05	3.572	.153	.287	.590	-9.39	-3.79	455.8	24.2
3.80	3.688	.088	.321	.478	-10.20	-2.57	467.6	13.8
4.70	3.780	.047	.362	.369	-10.91	-1.65	476.8	7.4
5.80	3.849	.025	.401	.286	-11.52	-1.05	483.8	3.8
7.10	3.900	.013	.437	.221	-11.99	-.66	489.0	1.9
8.70	3.941	.007	.470	.169	-12.37	-.41	493.0	1.0
10.70	3.973	.003	.500	.124	-12.68	-.24	496.1	.5

SL-7 - NORMAL FULL LOAD DEPARTURE
CONFORMAL MAPPING - 3 COEFFICIENTS

STATION 16
DRAFT = 32.860 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-32.860	3.706	1.853	-32.835	.0136	.9999	1.405
3.706	-32.810	3.709	5.552	-32.629	.0971	.9953	2.356
7.397	-32.449	3.709	9.243	-32.269	.0971	.9953	6.065
11.088	-32.089	3.707	12.914	-31.774	.1703	.9854	7.313
14.741	-31.458	3.706	16.545	-31.036	.2276	.9737	9.046
18.350	-30.614	3.709	20.144	-30.146	.2524	.9676	11.884
21.938	-29.678	3.708	23.700	-29.101	.3115	.9502	13.455
25.462	-28.523	3.707	27.201	-27.883	.3453	.9385	15.899
28.941	-27.243	1.851	29.785	-26.865	.4090	.9125	16.191
30.630	-26.486	1.851	31.474	-26.107	.4090	.9125	18.042
32.319	-25.729	3.708	33.919	-24.793	.5051	.8631	16.753
35.518	-23.856	3.705	37.039	-22.798	.5711	.8209	17.382
38.560	-21.740	3.705	39.954	-20.521	.6584	.7527	16.561
41.348	-19.301	3.709	42.640	-17.971	.7172	.6969	16.829
43.933	-16.641	3.707	45.074	-15.181	.7879	.6158	15.793
46.215	-13.721	3.701	47.141	-12.118	.8658	.5004	13.098
48.067	-10.516	3.705	48.790	-8.810	.9209	.3898	10.905
49.512	-7.104	3.707	50.091	-5.344	.9499	.3126	10.583
50.671	-3.583	3.707	51.147	-1.791	.9664	.2572	11.425
51.624	0.000						

FREQ. PARAM.	A' 33	N' Z	M S	N S	M S.R	N S.R	I R	N R
.00	INFINITY	0.000	1.514	0.000	-29.23	0.00	641.7	0.0
.01	11.045	.831	1.536	.000	-29.63	-.00	649.0	.1
.03	7.779	1.280	1.591	.002	-30.61	-.05	666.8	.9
.06	5.907	1.591	1.676	.013	-32.14	-.25	694.3	4.8
.10	4.702	1.794	1.783	.046	-34.01	-.88	727.0	16.6
.15	3.887	1.911	1.879	.121	-35.61	-2.26	753.6	42.4
.21	3.324	1.961	1.916	.252	-36.02	-4.66	756.7	86.2
.28	2.933	1.956	1.845	.433	-34.42	-7.89	722.4	143.9
.36	2.666	1.906	1.663	.628	-30.84	-11.26	652.9	201.9
.45	2.493	1.823	1.416	.795	-26.21	-13.99	566.9	246.3
.55	2.389	1.713	1.164	.910	-21.63	-15.70	484.6	271.1
.67	2.338	1.575	.927	.978	-17.47	-16.48	412.4	278.1
.82	2.337	1.405	.720	1.000	-14.01	-16.39	355.3	269.0
1.01	2.384	1.208	.557	.982	-11.44	-15.55	316.2	246.6
1.25	2.477	.995	.441	.932	-9.80	-14.15	294.7	215.2
1.55	2.601	.783	.367	.857	-8.98	-12.39	287.7	179.3
1.95	2.753	.577	.327	.762	-8.78	-10.33	291.8	140.6
2.45	2.906	.404	.317	.658	-9.06	-8.29	302.9	105.0
3.05	3.042	.274	.327	.557	-9.61	-6.47	316.7	75.6
3.80	3.161	.177	.350	.460	-10.29	-4.87	331.2	51.8
4.70	3.257	.112	.378	.375	-10.97	-3.58	344.2	34.5
5.80	3.337	.064	.410	.288	-11.64	-2.45	355.8	20.9
7.10	3.397	.038	.439	.226	-12.19	-1.71	364.8	12.9
8.70	3.444	.022	.467	.175	-12.66	-1.16	372.1	7.6
10.70	3.482	.012	.492	.130	-13.07	-.74	377.9	4.2

SL-7 - NORMAL FULL LOAD DEPARTURE
CONFORMAL MAPPING - 3 COEFFICIENTS

STATION 17
DRAFT = 32.878 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-32.878	3.353	1.673	-32.773	.0628	.9980	-.387
3.347	-32.668	3.379	4.957	-32.156	.3030	.9530	-5.020
6.567	-31.644	3.384	8.193	-31.175	.2771	.9608	-.767
9.819	-30.706	1.693	10.623	-30.441	.3126	.9499	.576
11.428	-30.176	1.693	12.232	-29.912	.3126	.9499	2.270
13.036	-29.647	3.386	14.608	-29.017	.3719	.9283	2.768
16.180	-28.388	3.387	17.753	-27.760	.3703	.9289	6.210
19.326	-27.133	3.384	20.880	-26.465	.3947	.9188	8.738
22.435	-25.798	3.387	23.953	-25.049	.4423	.8969	1.403
25.472	-24.300	3.384	26.983	-23.538	.4503	.8929	13.493
28.494	-22.776	3.387	29.921	-21.865	.5377	.8432	13.473
31.349	-20.955	3.380	32.725	-19.975	.5801	.8145	15.067
34.102	-18.994	3.387	35.387	-17.892	.6510	.7591	15.216
36.673	-16.790	3.385	37.868	-15.591	.7080	.7062	15.702
39.063	-14.393	3.378	40.149	-13.099	.7660	.6428	15.773
41.234	-11.805	3.385	42.199	-10.414	.8218	.5698	15.486
43.163	-9.023	3.385	44.044	-7.578	.8541	.5201	16.434
44.924	-6.132	3.386	45.698	-4.626	.8895	.4570	16.768
46.471	-3.120	3.386	47.129	-1.560	.9214	.3885	16.874
47.787	0.000						

FREQ. PARAM.	A' 33	N' Z	M S	N S	M S.R	N S.R	I R	N R
.00	INFINITY	0.000	1.325	0.000	-24.87	0.00	480.1	0.0
.01	9.570	.712	1.342	.000	-25.17	-.00	485.6	.0
.03	6.778	1.106	1.383	.002	-25.91	-.03	499.2	.6
.06	5.164	1.386	1.447	.009	-27.08	-.18	520.5	3.3
.10	4.114	1.578	1.528	.033	-28.54	-.61	547.0	11.3
.15	3.396	1.698	1.605	.086	-29.92	-1.59	571.6	29.5
.21	2.890	1.763	1.644	.181	-30.58	-3.34	582.7	61.7
.28	2.531	1.782	1.611	.317	-29.89	-5.82	568.6	107.1
.36	2.277	1.765	1.494	.472	-27.65	-8.63	526.1	157.9
.45	2.100	1.718	1.317	.614	-24.35	-11.17	464.4	203.3
.55	1.983	1.648	1.124	.721	-20.76	-13.04	398.1	236.1
.67	1.907	1.553	.930	.794	-17.22	-14.24	333.3	255.8
.82	1.870	1.430	.754	.829	-14.03	-14.73	275.8	262.1
1.01	1.872	1.279	.609	.829	-11.45	-14.55	230.0	255.8
1.25	1.913	1.106	.501	.799	-9.59	-13.81	198.0	239.0
1.55	1.987	.923	.429	.748	-8.40	-12.66	178.9	214.8
1.95	2.090	.732	.385	.676	-7.76	-11.14	170.2	184.2
2.45	2.205	.557	.367	.595	-7.61	-9.49	170.3	151.9
3.05	2.316	.412	.368	.514	-7.78	-7.87	176.1	121.3
3.80	2.421	.294	.380	.434	-8.16	-6.33	185.1	93.1
4.70	2.510	.206	.399	.360	-8.62	-4.97	195.2	69.5
5.80	2.589	.130	.421	.286	-9.14	-3.68	206.1	47.4
7.10	2.650	.085	.444	.229	-9.61	-2.74	215.3	32.7
8.70	2.700	.054	.466	.180	-10.05	-1.98	223.4	21.8
10.70	2.741	.033	.487	.140	-10.44	-1.39	230.3	13.9

SL-7 - NORMAL FULL LOAD DEPARTURE
CONFORMAL MAPPING - 5 COEFFICIENTS

STATION 18
DRAFT = 32.896 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-32.896	2.877	1.424	-32.695	.1401	.9901	-3.171
2.848	-32.493	3.012	4.032	-31.562	.6180	.7861	-16.337
5.216	-30.632	3.020	6.483	-29.811	.5435	.8394	-10.758
7.751	-28.990	3.020	9.052	-28.224	.5077	.8615	-6.532
10.353	-27.457	3.020	11.664	-26.707	.4964	.8681	-3.131
12.975	-25.958	3.020	14.263	-25.170	.5216	.8532	-.961
15.551	-24.383	1.510	16.209	-24.013	.4901	.8717	2.360
16.867	-23.643	1.510	17.525	-23.273	.4901	.8717	3.869
18.183	-22.903	3.021	19.420	-22.037	.5735	.8192	3.270
20.657	-21.171	3.020	21.909	-20.327	.5587	.8294	6.815
23.162	-19.484	3.021	24.364	-18.570	.6049	.7963	8.167
25.567	-17.656	3.019	26.749	-16.717	.6219	.7831	10.551
27.932	-15.778	3.021	29.078	-14.795	.6510	.7591	12.442
30.225	-13.812	3.019	31.316	-12.769	.6908	.7230	13.821
32.407	-11.727	3.020	33.464	-10.648	.7146	.6996	15.801
34.520	-9.569	3.021	35.520	-8.437	.7494	.6621	17.194
36.520	-7.304	3.019	37.454	-6.119	.7856	.6187	18.365
38.388	-4.933	3.020	39.277	-3.713	.8082	.5889	20.131
40.166	-2.492	3.020	41.019	-1.246	.8252	.5649	22.143
41.872	0.000						

FREQ.	A'	N'	M	N	M	N	I	N
PARAM.	33	Z	S	S	S.R	S.R	R	R
.00	INFINITY	0.000	1.198	0.000	-16.98	0.00	313.5	0.0
.01	7.632	.558	1.210	.000	-17.17	-.00	316.7	.0
.03	5.454	.875	1.238	.001	-17.64	-.02	324.3	.3
.06	4.180	1.109	1.284	.006	-18.38	-.10	336.5	1.5
.10	3.340	1.277	1.342	.022	-19.34	-.34	352.3	5.4
.15	2.756	1.393	1.402	.057	-20.33	-.90	369.0	14.3
.21	2.338	1.466	1.440	.122	-21.03	-1.94	381.3	31.0
.28	2.033	1.505	1.434	.218	-21.01	-3.51	382.6	56.5
.36	1.809	1.516	1.369	.335	-20.05	-5.44	368.5	88.3
.45	1.646	1.505	1.254	.452	-18.24	-7.40	340.4	121.3
.55	1.529	1.476	1.113	.548	-15.99	-9.07	304.5	150.2
.67	1.441	1.428	.963	.621	-13.53	-10.39	264.4	173.8
.82	1.380	1.359	.817	.665	-11.10	-11.26	224.0	190.7
1.01	1.346	1.268	.692	.679	-8.95	-11.65	187.3	200.0
1.25	1.341	1.157	.595	.666	-7.24	-11.60	157.0	202.1
1.55	1.362	1.031	.528	.634	-5.98	-11.20	134.0	198.1
1.95	1.407	.889	.484	.584	-5.10	-10.49	116.7	188.5
2.45	1.468	.747	.462	.526	-4.59	-9.58	106.0	174.7
3.05	1.535	.619	.456	.466	-4.38	-8.59	100.5	158.3
3.80	1.604	.501	.461	.405	-4.36	-7.53	98.7	139.9
4.70	1.668	.401	.471	.348	-4.47	-6.49	99.8	121.1
5.80	1.727	.316	.485	.296	-4.67	-5.49	102.6	102.3
7.10	1.777	.247	.499	.250	-4.89	-4.58	106.4	84.9
8.70	1.826	.177	.512	.201	-5.19	-3.61	111.4	65.2
10.70	1.866	.131	.527	.163	-5.46	-2.86	116.4	50.7

SL-7 - NORMAL FULL LOAD DEPARTURE
CONFORMAL MAPPING - 5 COEFFICIENTSSTATION 19
DRAFT = 32.914 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-32.914	2.229	1.070	-32.601	.2806	.9598	-8.121
2.139	-32.289	2.657	2.680	-31.075	.9135	.4068	-27.298
3.220	-29.862	2.656	3.943	-28.747	.8390	.5441	-21.975
4.665	-27.633	2.664	5.551	-26.638	.7471	.6647	-16.211
6.436	-25.643	2.662	7.369	-24.693	.7134	.7007	-12.454
8.301	-23.744	2.664	9.255	-22.814	.6979	.7162	-9.293
10.209	-21.885	2.663	11.199	-20.995	.6685	.7437	-5.707
12.189	-20.105	2.663	13.227	-19.269	.6272	.7788	-1.785
14.264	-18.434	2.664	15.308	-17.607	.6207	.7841	1.075
16.352	-16.781	2.660	17.292	-15.839	.7076	.7066	1.011
18.232	-14.898	2.663	19.161	-13.944	.7164	.6977	3.380
20.090	-12.990	2.664	21.081	-12.100	.6683	.7439	7.595
22.072	-11.210	2.663	23.051	-10.307	.6781	.7350	9.952
24.029	-9.404	2.664	24.979	-8.470	.7015	.7127	11.861
25.928	-7.535	2.664	26.886	-6.610	.6949	.7191	14.739
27.843	-5.684	1.332	28.326	-5.225	.6892	.7245	16.922
28.808	-4.766	1.332	29.291	-4.307	.6892	.7245	18.254
29.774	-3.848	2.663	30.703	-2.894	.7163	.6978	19.353
31.632	-1.941	2.663	32.544	-.970	.7286	.6849	21.583
33.456	0.000						

FREQ. PARAM.	A' 33	N' Z	M S	N S	M S.R	N S.R	I R	N R
.00	INFINITY	0.000	1.186	0.000	-4.38	0.00	167.8	0.0
.01	5.067	.358	1.195	.000	-4.45	-.00	168.4	.0
.03	3.677	.570	1.217	.001	-4.63	-.01	170.0	.0
.06	2.847	.733	1.251	.004	-4.92	-.03	172.4	.2
.10	2.288	.857	1.297	.014	-5.31	-.11	175.9	.8
.15	1.891	.948	1.346	.038	-5.76	-.29	180.0	2.1
.21	1.600	1.012	1.388	.084	-6.17	-.64	184.1	4.9
.28	1.382	1.055	1.402	.156	-6.41	-1.23	187.2	9.6
.36	1.217	1.080	1.374	.251	-6.32	-2.03	185.9	16.4
.45	1.091	1.089	1.300	.357	-5.84	-2.98	185.4	24.8
.55	.996	1.086	1.193	.454	-5.05	-3.91	180.1	33.7
.67	.919	1.072	1.064	.536	-4.02	-4.78	172.3	42.6
.82	.858	1.044	.929	.592	-2.85	-5.51	162.7	51.1
1.01	.813	1.002	.805	.619	-1.69	-6.02	152.5	58.5
1.25	.786	.945	.706	.617	-.66	-6.31	142.7	64.4
1.55	.777	.875	.635	.592	.17	-6.40	133.9	68.9
1.95	.784	.789	.588	.550	.85	-6.30	125.9	71.9
2.45	.805	.698	.564	.499	1.33	-6.06	119.3	73.1
3.05	.836	.608	.555	.445	1.64	-5.71	114.4	72.5
3.80	.872	.520	.557	.391	1.83	-5.28	110.9	70.1
4.70	.909	.440	.565	.341	1.92	-4.80	108.7	66.1
5.80	.945	.367	.576	.294	1.95	-4.28	107.8	60.6
7.10	.978	.303	.589	.254	1.93	-3.76	107.8	54.2
8.70	1.008	.245	.602	.218	1.90	-3.22	108.4	46.9
10.70	1.034	.193	.614	.186	1.87	-2.69	109.2	39.3

SL-7 - NORMAL FULL LOAD DEPARTURE
CONFORMAL MAPPING - 5 COEFFICIENTS

STATION 20
DRAFT = 32.932 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-21.908	1.809	.904	-21.908	.0000	1.0000	.904
1.809	-21.908	1.718	2.650	-21.734	.2032	.9791	-1.823
3.491	-21.559	1.797	3.940	-20.781	.8660	.5000	-16.027
4.389	-20.003	1.809	4.837	-19.217	.8692	.4944	-14.313
5.284	-18.431	1.809	5.734	-17.647	.8672	.4980	-12.447
6.184	-16.862	1.806	6.708	-16.126	.8151	.5793	-9.258
7.231	-15.390	1.809	7.774	-14.667	.7996	.6005	-7.060
8.317	-13.944	1.808	8.876	-13.233	.7859	.6184	-4.910
9.435	-12.523	1.809	10.009	-11.824	.7727	.6348	-2.782
10.583	-11.125	1.807	11.171	-10.439	.7597	.6503	-.666
11.758	-9.752	1.809	12.411	-9.126	.6923	.7217	2.639
13.064	-8.500	1.809	13.716	-7.874	.6923	.7217	4.447
14.369	-7.248	1.809	15.030	-6.631	.6824	.7310	6.462
15.691	-6.014	1.809	16.359	-5.404	.6742	.7385	8.438
17.027	-4.795	1.809	17.695	-4.185	.6742	.7385	10.247
18.363	-3.575	1.809	19.043	-2.979	.6592	.7520	12.356
19.723	-2.383	1.809	20.405	-1.789	.6567	.7542	14.214
21.087	-1.195	.904	21.426	-.896	.6609	.7505	15.488
21.765	-.598	.904	22.105	-.299	.6609	.7505	16.392
22.444	0.000						

FREQ.	A'	N'	M	N	M	N	I	N
PARAM.	33	Z	S	S	S.R	S.R	R	R
.00	INFINITY	0.000	.590	0.000	-.93	0.00	30.9	0.0
.01	2.440	.160	.593	.000	-.95	-.00	31.0	.0
.03	1.824	.260	.600	.000	-.98	-.00	31.1	.0
.06	1.446	.342	.611	.001	-1.03	-.00	31.4	.0
.10	1.183	.409	.627	.003	-1.10	-.01	31.7	.0
.15	.990	.461	.647	.009	-1.19	-.03	32.1	.1
.21	.843	.502	.667	.021	-1.29	-.08	32.6	.3
.28	.730	.534	.686	.041	-1.39	-.16	33.1	.6
.36	.641	.556	.698	.073	-1.47	-.29	33.6	1.1
.45	.570	.572	.696	.115	-1.50	-.47	33.9	1.9
.55	.514	.581	.679	.166	-1.47	-.70	34.0	3.0
.67	.465	.586	.642	.224	-1.36	-.98	33.8	4.3
.82	.423	.584	.585	.283	-1.15	-1.30	33.1	6.0
1.01	.388	.576	.514	.333	-.85	-1.61	31.9	7.8
1.25	.360	.560	.443	.365	-.52	-1.86	30.5	9.5
1.55	.341	.536	.381	.376	-.20	-2.04	28.9	11.1
1.95	.329	.502	.332	.368	.08	-2.15	27.3	12.6
2.45	.327	.461	.300	.347	.31	-2.18	25.8	13.7
3.05	.331	.416	.281	.319	.48	-2.16	24.6	14.6
3.80	.341	.369	.272	.287	.60	-2.09	23.4	15.1
4.70	.354	.323	.269	.255	.69	-1.98	22.5	15.3
5.80	.369	.277	.271	.223	.73	-1.83	21.7	15.1
7.10	.384	.236	.275	.193	.75	-1.67	21.2	14.4
8.70	.400	.197	.280	.165	.75	-1.48	20.8	13.4
10.70	.415	.161	.287	.140	.74	-1.28	20.6	12.0

SL-7 - NORMAL FULL LOAD DEPARTURE
CONFORMAL MAPPING -5 COEFFICIENTS

STATION 21
DRAFT = 32.950 FEET

ENDPOINTS OF SEGMENTS			SEGMENT MIDPOINTS		SINE	COSINE	MOMENT
H-BRDTH	HEIGHT	LENGTH	H-BRDTH	HEIGHT			
.000	-6.703	.673	.337	-6.703	0.0000	1.0000	.327
.673	-6.703	.673	1.010	-6.703	0.0000	1.0000	1.010
1.347	-6.703	.337	1.515	-6.703	.0000	1.0000	1.515
1.684	-6.703	.337	1.852	-6.703	.0000	1.0000	1.852
2.020	-6.703	.664	2.274	-6.489	.6456	.7637	-2.453
2.527	-6.275	.673	2.776	-6.048	.6742	.7385	-2.027
3.025	-5.821	.673	3.273	-5.594	.6742	.7385	-1.354
3.522	-5.367	.673	3.771	-5.140	.6742	.7385	-.680
4.020	-4.913	.673	4.268	-4.685	.6742	.7385	-.007
4.517	-4.458	.673	4.766	-4.231	.6742	.7385	.667
5.014	-4.004	.673	5.263	-3.777	.6742	.7385	1.340
5.512	-3.550	.673	5.763	-3.327	.6637	.7480	2.103
6.015	-3.103	.673	6.268	-2.881	.6596	.7517	2.811
6.521	-2.659	.673	6.775	-2.437	.6596	.7517	3.485
7.028	-2.215	.673	7.281	-1.993	.6596	.7517	4.158
7.534	-1.771	.673	7.787	-1.549	.6596	.7517	4.831
8.040	-1.327	.673	8.293	-1.105	.6596	.7517	5.505
8.546	-.883	.673	8.799	-.661	.6596	.7517	6.178
9.052	-.439	.673	9.308	-.219	.6512	.7589	6.921
9.563	0.000						

FREQ.	A'	N'	M	N	M	N	I	N
PARAM.	33	Z	S	S	S.R	S.R	R	R
.00	INFINITY	0.000	.057	0.000	-.20	0.00	.9	0.0
.01	.537	.030	.057	.000	-.20	-.00	1.0	.0
.03	.426	.050	.058	.000	-.20	-.00	1.0	.0
.06	.356	.067	.058	.000	-.20	-.00	1.0	.0
.10	.305	.083	.059	.000	-.21	-.00	1.0	.0
.15	.265	.097	.059	.000	-.21	-.00	1.0	.0
.21	.234	.109	.060	.000	-.21	-.00	1.0	.0
.28	.208	.120	.061	.001	-.22	-.00	1.0	.0
.36	.187	.129	.062	.001	-.22	-.00	1.0	.0
.45	.169	.137	.064	.002	-.23	-.01	1.1	.0
.55	.154	.143	.065	.003	-.23	-.01	1.1	.1
.67	.141	.149	.066	.005	-.24	-.02	1.1	.1
.82	.128	.154	.067	.008	-.24	-.03	1.1	.1
1.01	.115	.159	.068	.013	-.25	-.05	1.2	.2
1.25	.104	.162	.068	.020	-.25	-.08	1.2	.3
1.55	.094	.164	.066	.029	-.24	-.12	1.1	.5
1.95	.085	.164	.061	.040	-.22	-.17	1.1	.7
2.45	.078	.162	.054	.051	-.19	-.21	.9	.9
3.05	.073	.157	.047	.058	-.16	-.25	.8	1.1
3.80	.069	.151	.040	.063	-.13	-.27	.7	1.2
4.70	.067	.142	.035	.064	-.11	-.29	.6	1.3
5.80	.067	.131	.030	.063	-.09	-.29	.5	1.3
7.10	.067	.120	.028	.060	-.08	-.28	.4	1.3
8.70	.068	.107	.026	.056	-.07	-.27	.4	1.3
10.70	.071	.094	.025	.052	-.06	-.25	.3	1.2